

SUMMARY AND RESPONSE TO PUBLIC COMMENTS

Permit No: Aquifer Protection Permit (APP) No 101704, LTF 76820

Facility Name: Florence Copper Project

Applicant: Florence Copper Inc.

Permit Action: Response to comments received during the public comment period: August 6, 2020 to October 12, 2020

Prepared By: Arizona Department of Environmental Quality (ADEQ)
Groundwater Protection Section
1110 W. Washington Street
Phoenix, Arizona 85007

Date: December 8, 2020

A. INTRODUCTION

Summary

The project is an in-situ copper recovery (ISCR) operation located in Pinal County. The copper recovery process involves injecting leach solutions (lixiviant) into the ore body using injection wells and extracting copper-bearing solutions (pregnant leach solutions or PLS) through surrounding recovery wells. The estimated injection zone is between approximately 500 feet below ground surface (ft. bgs) to 1,185 ft. bgs. The resulting copper-bearing solution will be pumped by recovery wells to the surface where copper will be removed from the solution in a solvent extraction electrowinning (SX/EW) plant. The barren solution from the SX/EW plant will be re-acidified and re-injected back into the oxide zone.

The anticipated duration of injection and recovery operation for each well is approximately 4 years. Each well will be taken out of injection/recovery service once the economically producible copper has been recovered. Injection and recovery wells that have been taken out of service will be used to rinse the formation while injection and recovery operations continue in other areas of the ISCR Area. Rinsing will be conducted in the same sequence in which the wells are taken out of service and shall commence within 6 months of a well being taken out of service, subject to a sufficient number of wells available to effectively rinse the mined area.

During rinsing, rinse solution is injected and recovered to return the injection zone to pre-leaching water quality conditions. Rinsing is estimated to begin in year 5 of ISCR operations on the first injection and recovery wells, and is anticipated to continue at each well for a period of 2 years, during which time, approximately 6 to 9 pore volumes of water will have been flushed through the formation. Rinsing will continue through the end of copper extraction operations and for another 2 years beyond. Once rinsing has been completed, each of the wells will be plugged and abandoned, except for selected wells that will remain open for monitoring post closure.

Public Notice Comments

The public comment period began on August 6, 2020 and ended on October 12, 2020. Publication of the preliminary decision to issue a significant amendment to an individual APP and the associated public hearing was published in the Florence Reminder on August 6, 2020; this first public notice indicated the comment period would close on September 11, 2020. A second public notice was published on August 28, 2020, to extend the comment period to October 12, 2020. A virtual public hearing was held on September 9, 2020. This summary of public comments received and associated ADEQ responses is prepared in accordance with the Arizona Administrative Code (A.A.C.) R18-9-109.

Everyone who commented during the public comment period has the right to file an appeal and request a hearing on the final decision as an appealable agency action under A.R.S. § 41-1092.03 by filing a written Request for Hearing or Notice of Appeal within 30 days of issuance of the final decision. A Request for Hearing or Notice of Appeal is filed when it is received by ADEQ's Hearing Administrator as follows:

Hearing Administrator
Office of Administrative Counsel
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, AZ 85007

The Request for Hearing or Notice of Appeal shall identify the party, the party's address, the agency and the action being appealed and shall contain a concise statement of the reasons for the appeal. Upon proper filing of a Request for Hearing or Notice of Appeal, ADEQ will serve a Notice of Hearing on all parties to the appeal. If you file a timely Request for Hearing or Notice of Appeal you have a right to request an informal settlement conference with ADEQ under A.R.S. § 41-1092.06. This request must be made in writing no later than 20 days before a scheduled hearing and must be filed with the Hearing Administrator at the above address.

Comments received during the public comment period are summarized below in **Section C (Written) and Section D (Verbal)**. Comments may have been shortened or paraphrased for presentation in this document; a copy of the unabridged comments is available upon written request from the ADEQ Records Center, recordscenter@azdeq.gov.

The comments are followed by ADEQ's response shown in *italics*. Comments are organized as follows:

Commenter #	Source	Method
1	Alexander Kovras	Written
2	Anthony Smith, Pinal County Supervisor	Written
3	Anthony Velez	Written
4	Mark Davis	Written
5	Barbara McGuire, Former State Representative and State Senator	Written
6	Bob Stevenson	Written
7	John Bryant, Tom Gonzales, Rhett Keller Brian Wiggins, Christopher Wiggins	Written
8	Chaz Smith	Written
9	Cheryl Chase, Former State Representative and Pinal County Supervisor	Written
10	Raymond Grant	Written
11	Daniel Green	Written
12	David Davies	Written
13	David Orris	Written
14	Debi Neely Coolidge Chamber of Commerce	Written
15	Deborah McEwen	Written
16	Debra Graber	Written
17	Diane Johnson	Written
18	Eric Mears	Written and Verbal
19	Fritz Peiffer	Written
20	Gerald and Verona Muse	Written
21	Greg Emann	Written
22	Hans Nielsen	Written
23	Jacqueline Dunsing	Written
24	Jim Blackwell	Written

25	Jim Hurley	Written
26	John Zander	Written
27	Jose Maldonado	Written
28	Judy Young	Written
29	Keith Kinney	Written
30	Keith Stanford	Written
31	Ken Roane	Written
32	Kevin Gilbreth	Written
33	Kevin Schaal	Written
34	Linda Show	Written
35	Mark Finchem, State Representative	Written and Verbal
36	Matt Nehmeyer	Written
37	Mel and Linda Hansen	Written
38	Merrit Strunk	Written
39	Michael Baca	Written
40	Pam Tittes	Written
41	Paul Stockburger	Written
42	Randy Robles	Written
43	Richard Murdick	Written
44	Robert Dietrich	Written
45	Robert Stuart	Written
46	Roberta Wilson	Written
47	Roger Biede, Florence Chamber of Commerce	Written and Verbal
48	Roy Lamps	Written
49	Stephanie Aguilar	Written
50	Steve Nanos	Written
51	Steve Pratt	Written
52	Steve Trussel, Arizona Mining Association, Arizona Rock Products Association	Written
53	Terry Rattey	Written
54	Wilbur and Dodi Freeman	Written
55	William and Elisabeth Trueman	Written
56	William Tanner	Written
57	William Thompson	Written
58	William Vockel	Written
59	Karen Wall	Written
60	Arne and Judy Hawkins	Written
61	Ferdinand and Audrey Sobota	Written
62	Skip Daum	Written
63	Art Clements	Written
64	Barbara U. Rodriguez-Pashkowski, on behalf of the Town of Florence	Written
65	Dennis and Barbara Manning	Written
66	Armand Young	Written

67	Kyle Varvel, United States Department of the Interior, Bureau of Indian Affairs, San Carlos Irrigation Project	Written
68	Ronnie P. Hawks on behalf of SWVP-GTIS MR, LLC ("SWVP")	Written
69	Brent Berg	Written and Verbal
70	Jennifer Saran	Written
71	David Cook, State Representative	Verbal
72	David Malton	Verbal
73	Bill Tanner	Verbal
74	Elizabeth Young	Verbal
75	Dennis Reppond	Verbal
76	Corey Ecenbarger	Verbal
77	John Bracich	Verbal
78	Kim Ehlebracht	Verbal
79	Kyle Larsen	Verbal
80	Linda Turner	Verbal
81	Michelle Cordes	Verbal
82	Laurie Leiman	Verbal
83	Rhett Keller	Verbal
84	Richard Sichling	Verbal
85	Rick Grinnell	Verbal
86	Sammi Jo Beebe	Verbal
87	Sidney Hay, AMIGOS	Verbal
88	Brett Tanner	Verbal
89	Vince Leach AZ State Senator	Verbal
90	Brad Glass	Verbal
91	John Anderson	Verbal
92	Lee Decker	Verbal
93	Mark Nicholls	Verbal
94	Richarge Tremblay	Verbal
95	Rita Maguire	Verbal
96	Glen Hoffmeyer	Verbal

B. DESCRIPTION OF DRAFT CHANGES TO THE PERMIT

A number of minor typographic errors were corrected and clarifying language edits made in the permit that are not reviewed in detail here.

Substantive changes to the permit include:

1. The draft permit included the use of mechanical evaporators for the PTF Process Water Impoundment (Section 2.3.2) and the BHP Copper Evaporation Pond (section 2.3.5). ADEQ has revised these two sections of the permit to include a requirement that the mechanical evaporators shall be taken off service if wind speeds cause overspray of impounded liquid outside of the lined portions of the ponds.
2. The draft permit did not include the use of mechanical evaporators for Water Impoundments 1 through 5 (Section 2.3.10); this was an error in the draft permit, because application Attachment 2, Design Flow, EXHIBIT 2-1, Design Flow Calculations Technical Memorandum dated June 12, 2019, Haley and Aldrich, indicates that mechanical evaporators are proposed for use at Water Impoundments 1 through 5. ADEQ has revised this permit section to authorize the use of mechanical evaporators, and has included a requirement that the mechanical evaporators shall be taken off service if wind speeds cause overspray of impounded liquid outside of the lined portions of the ponds
3. The draft permit did not include POC monitoring well M32-UBF; this was an error in the draft permit because the application, Attachment 12, proposes replacing existing POC well M32-UBF with a new POC well re-located to be adjacent to the proposed Water Impoundment 4. ADEQ has revised the following sections and permit tables to include M32-UBF: Section 2.4 Point of Compliance, Section 2.5.3.2 Ambient Groundwater Quality Monitoring for Point of Compliance (POC) Wells, Section 3.0 Compliance Schedule, Table 13 Quarterly Compliance Groundwater Monitoring, and Table 14 Annual Groundwater Monitoring.
4. The draft permit did not include a deadline for submitting a report to ADEQ in Section 2.6.2.8. Exceeding Alert Levels for Well Bore Electrical Conductivity, Paragraph #4.e.b. ADEQ has added a deadline for report submittal of 90 days from alert level exceedance verification.
5. The draft permit did not specify that treated formation water could be used for closure rinsing activities; this was an error in the draft permit because the application, Attachment 2, Design Flow, EXHIBIT 2-1, Design Flow Calculations Technical Memorandum dated June 12, 2019, Haley and Aldrich, and Figure 6-2 Florence Copper Rinsing Flow Sheet, indicates that water extracted from the ISCR wells will be treated and used for rinsing. ADEQ has revised permit Sections 2.2.5 and 2.9.1.1 to authorize use of treated formation water for rinsing. Sections 2.7.4.2.1 and 2.7.4.5 have been revised to require reports that include analytical results for monthly samples of the treated water for Table 12 parameters to demonstrate the treated water is of a quality sufficient to achieve the closure criteria of Section 2.9.1.1
6. The draft permit authorized use of a “water level well” for monitoring hydraulic control. ADEQ has removed the reference to “water level wells” in Section 2.5.8.1 and Table 15. If additional wells are needed to demonstrate hydraulic control, Florence Copper will propose the well locations and ADEQ will review and amend the permit accordingly.
7. The draft permit included contingency requirements for four POC wells based on a use protection level (UPL) for arsenic of 0.01 milligrams per liter (mg/L), consistent with EPA’s primary drinking water standard for arsenic. The draft permit designated the four wells based on their location at the northwest corner of the State Lease Land, which was downgradient of the Florence Copper Production Test Facility (PTF). ADEQ has revised the permit to require the contingency actions for all POC wells downgradient of the ISCR Area per permit Section 2.6.2.5.3 Alert Levels to Protect Downgradient Users from Pollutants Using a Narrative Aquifer Water Quality Standard.
8. The draft permit included a requirement to measure fluid electrical conductivity by a comparison of fluid sample collected from all Observation Wells and all Injection Wells (Table 15 In-Situ BADCT Monitoring). Florence Copper has requested revised language to specify “Comparison of conductivity measurements taken from all Observation Wells and all Injection Wells”. This language change allows more flexibility and accuracy during operations in how these data are obtained: the conductivity values can be obtained from a sample of fluid taken from the well, or it can be obtained using an in-situ device that would be installed in the

well and would automatically measure and record conductivity measurements. ADEQ has revised permit Table 15 language accordingly.

9. ADEQ has added the following compliance schedule items to permit Section 3.0.
 - a. The permittee shall submit an amendment application to revise permit groundwater monitoring requirements related to the location of annular conductivity devices (ACDs), to be consistent with the U.S. EPA UIC permit for this facility. Due date: prior to discharge to the ISCR wells.
 - b. The permittee shall notify ADEQ of all court decisions in the zoning case between Florence Copper and the Town of Florence. Due date: within 30 days of the court's decision.
 - c. The permittee shall provide copies of their correspondence sent to the U.S. EPA regarding the UIC permit, including letters and/or reports related to modifying the UIC permit, compliance with the UIC permit, and monitoring reports as required by Section 2.7.4.2.1(15). Due date: within 10 days of the date of correspondence.

C. WRITTEN COMMENTS

Written comments received on the official record were received during the Public Comment period.

Commenters 1 through 58: Numerous commenters voiced support for permit issuance citing various reasons including the protection provided by the permit. ADEQ reviewed these comments and grouped them together because of their common theme.

ADEQ response
Comments noted.

#59, Karen Wall: The commenter submitted an email dated September 4, 2020 and letter received October 13, 2020. ADEQ has added numbering to the comments (1 through 21).

September 4, 2020 Email

59.1. I'm writing to emphatically request that ADEQ change the date of the public hearing on Florence Copper's APP No.101704 from September 9, 2020 to a date that is closer to the end of the extended public comment period of October 12, 2020. This permit is significant to residents of Florence who obtain their drinking water from the same aquifer as the one Florence Copper proposes to drill through and inject a solution strong enough to dissolve copper and other minerals. The commercial operation is planned for more than 20 years and residents and other interested parties deserve a longer period of time to review the draft permit in order to provide meaningful comments. It makes no sense that the original public hearing date would remain as originally scheduled when ADEQ concurred that it was reasonable to extend the comment period. Please extend the date for the public hearing.

ADEQ response

ADEQ determined that changing the public hearing date could be problematic if people who read the original public notice and hearing date did not read the second public notice that extended the comment period. Therefore, ADEQ decided to hold the hearing on the originally published date. The second public notice reiterated the public hearing date to avoid any mis-communication or confusion. All interested parties who were still in the process of reviewing the permit on the hearing date, September 9, 2020, still had the opportunity to submit written comments until the public comment deadline of October 12, 2020.

Letter received October 13, 2020

59.2. Thank you for the opportunity to comment on the possible issuance of an Aquifer Protection Permit to Florence Copper. Should the permit be finalized and issued, it will have a significant impact on the surrounding property owners and the aquifer from which we draw our drinking water.

The APP would be issued for a period covering "the life of the project". I have seen estimates that could be as long as 20 years or more or until they have extracted all of the copper from the wells they have drilled. Why isn't there is a date certain for the timeframe in which they are authorized to extract copper? As we have observed in many cases, circumstances change, technology changes and issues can arise that would make continuation of the permit unwise. What events or circumstances would cause the permit to be terminated?

ADEQ response

The permit authorizes specific activities under specific conditions to protect human health and the environment. As long as the permittee complies with all of the permit conditions, ADEQ does not have reason to limit the timeframe of the permitted operations. Where a permittee violates its permit conditions, the ADEQ Director can revoke the permit. APP regulations authorize the ADEQ Director to revoke a permit for the following several reasons (A.A.C. R18-9-A213): (1) a permittee fails to comply with any applicable provision of the APP statute and rule, (2) a permittee misrepresented or omitted a fact, information, or data related to the APP application or permit condition, (3) the Director determines that a permitted activity is causing or will cause a violation of an Aquifer Water Quality Standard at a point of compliance, (4) a permitted discharge is causing or will cause imminent and substantial endangerment to public health or the environment, (5) a permittee failed to maintain the financial capability, or (6) a permittee failed to construct a facility within five years of permit issuance and (a) it is necessary to update BADCT for the facility and (b) the Department has not issued an amended permit.

59.3. The permit includes plans to drill as many as 1,900 wells during the life of the project, over an area encompassing about 200 acres. I remember the pounding noise from the drills on the State land when the production test facility

began. Drilling went on 24 hours a day with multiple drill rigs operating with a lot of lights on each one that could be seen throughout the area. This was when they only drilled a few wells. I can only imagine the impact of continuously drilling 1,900 wells over the next 20 years. The noise and lights will be more intrusive as developers build more homes or businesses are built closer and closer to the commercial operation. Why aren't there any restrictions on noise or light pollution in the permit that would mitigate this impact?

ADEQ response

ADEQ does not have authority under the APP program to regulate or require mitigation of light and noise.

Pinal County has noise and light ordinances, see the following links:

<https://www.pinalcountyz.gov/Sheriff/Documents/NoiseOrdinance.pdf> and

<https://www.codepublishing.com/AZ/PinalCounty/html/PinalCounty02/PinalCounty02195.html>

59.4. The wells will not all be drilled at once. Instead, there will be "blocks" of wells including injection and recovery wells. Once extraction of copper is no longer profitable, the wells will be shut down and a new block of wells will be put in service. The permit requires that Florence Copper begin "rinsing" the groundwater into which the sulfuric acid has been injected to dissolve the copper. The permit only requires that this rinsing process be started within six months of shutdown. If an extraction well is shut down but rinsing doesn't begin for days, weeks or months afterwards, what prevents the loss of hydraulic control, allowing the sulfuric acid solution to migrate further into the groundwater and contaminate the aquifer?

ADEQ response

Permit Section 2.2.4(9) addresses this concern by requiring the following:

Automatic controls and alarms shall be used in the well field to ensure process upsets do not result in the loss of hydraulic control. Hydraulic control over the injected solutions shall be maintained from the time injection begins and until well abandonment is completed by the permittee and approved by the appropriate regulatory agencies and groundwater in the resource blocks meets Section 2.9 closure criteria. ([Emphasis added].)

59.5. I've seen the test facility impoundment visible from Hunt Highway and the blowers that spewed the process water into the air and over the embankment when the wind was blowing. We're told this is done to speed up the evaporation of the process water in the impoundment. The draft permit contemplates a total of 11 impoundments. Are the contents of that mist being monitored or regulated? Is the process water being tested before the blowers are turned on? Is the mist that hits the ground outside of the impoundment contaminating the air and soil in the area?

ADEQ response

The APP permit has been revised to include the requirement that mechanical evaporators be taken off service if wind speeds cause overspray of impounded liquid outside the lined portion of the impoundment. It is ADEQ's understanding that the characteristics and quantity of pollutants released by the mechanical evaporators were determined to be insignificant and did not trigger air quality monitoring under the Pinal County permit for the PTF Process Water Impoundment. Florence Copper will be required to update the Pinal County permit prior to operating the mechanical evaporators for the BHP Copper Evaporation Pond. Air quality monitoring, if any, would be required by the Air Quality Permits. The Pinal County Air Quality District's website is at: <https://www.pinalcountyz.gov/airquality>

59.6. When Florence Copper initially applied for the commercial operation permit, the production test facility was not even one year old, even though that temporary permit was issued for a total of two years. The test facility still hasn't been operating for two years. All of the data from the two-year test isn't even available yet. How can the safety of the commercial operation be adequately evaluated without a complete set of real data as opposed to modeled assumptions?

ADEQ response

Weekly and Quarterly reports submitted by Florence Copper for the PTF operation included the groundwater and BADCT monitoring data required by the PTF permit starting in December 2018 through the present. ADEQ reviewed these reports during review of the commercial facility application and used the information to draft this area-wide permit. The reports indicate that hydraulic control of the injected solution was maintained at all times during the PTF in-situ copper injection and recovery operation, meaning that there was no loss of solution outside of the PTF well field. The PTF rinsing phase has not yet been completed; however, the PTF permit requires that rinsing of the PTF well field be incorporated into this area-wide permit. For this reason, the area-wide permit includes requirements for a PTF Well Field Rinsing Demonstration Report (permit Section 2.7.4.5) that documents rinsing demonstration activities, data collection and analysis, and that demonstrates the PTF well field has been rinsed sufficiently to meet the rinsing requirements of the permit. The report must be

submitted and approved by ADEQ prior to re-commencing injection at the PTF and prior to injection in the first commercial operation well block. The commercial well field will be operated using the BADCT design and operational requirements that have proven effective during the PTF operation, and will be monitored to assure compliance with the requirements, thereby ensuring hydraulic control over solutions will be maintained and groundwater protected.

The following comments express additional concerns about the danger to the aquifer, the financial burden to the Town, impact on the residents and businesses in the area, communications, and the legality of conducting mining operations on the property:

59.7. The project is located within the flood plain of the Gila River, one of the longest rivers in the west with a watershed of nearly 60,000 square miles. Does the permit require any monitoring or sampling of the Gila River surface water or the subbasin?

ADEQ response

The permit does not require monitoring or sampling of the Gila River. Florence Copper has coverage under the Multi-Sector General Permit (MSGP) Industrial for stormwater, LTF #: 80497, ID #: AZMS80497, which requires monitoring once per wet season.

APP Application Section 14.4 indicates the well field and surface impoundments will not be located within the flood plain of the Gila River. The wells and surface impoundments are protected from the 100-year, 24-hour storm event by stormwater diversion features designed and depicted in the drawings and specifications approved under this permit. The diversions are designed to prevent mixing of pollutants with stormwater, and thus protect the Gila River and subbasin.

From the application:

The Federal Emergency Management Agency (FEMA) has produced a series of Flood Insurance Rate Maps (FIRM) for use in delineating the probable maximum extent of inundation (100-year flood plain) due to a precipitation event with a 24-hour duration and a recurrence interval of 100 years. Current FIRM maps (dated 4 December 2007) numbered 04021C0867E, 04021C0870E, and 04021C0875E (Exhibit 14-8) show the extent of the 100-year flood plain in the vicinity of the FCP site. The 100-year flood plain is shown on Figure 14-1, and the 100-year flood plain delineation line is included on Figures 8-1, and 12-1. All proposed discharging facilities, processing facilities, and related infrastructure will be located outside of the 100-year flood plain identified on the FEMA maps included in Exhibit 14-8.

59.8. The injected sulfuric acid solution will dissolve other heavy metals and radionuclides in addition to the copper. How will these be safely managed so as not to contaminate the water, air or ground?

ADEQ response

Process solutions will be managed in the well field by using properly designed and constructed injection/recovery wells and maintaining hydraulic control at all times. Solutions will be conveyed and processed in pipes and tanks with secondary containment (berms), and in lined ponds to prevent contact with the ground surface. The well field closure requirements include rinsing the formation until groundwater meets aquifer quality limits for metals, adjusted gross alpha particle activity, and Radium 226 and 228. The rinse water will be contained in pipes, tanks and lined ponds during the rinsing process, and these facilities will ultimately be closed by meeting closure plan requirements including soil sampling and characterization to meet soil and groundwater protection standards.

59.9. Arizona is suffering from drought conditions affecting Florence and Pinal County. The groundwater table has already been diminished by overpumping for farming. Florence Copper also will be extracting groundwater, thus exacerbating the problem.

ADEQ response

ADEQ does not have authority under the APP program to evaluate or regulate groundwater withdrawal. The state Department of Water Resources (new.azwater.gov) monitors and regulates groundwater quantity by issuing Groundwater Withdrawal permits in Arizona. The purpose of the Groundwater Withdrawal program is to quantify and limit the extraction of groundwater within an Active Management Area (AMA). The Florence Copper Project is located within the Pinal AMA.

59.10. The size and scope of the project will require the Town of Florence to increase its preparedness for fire and emergency services, including training and equipping hazardous response teams.

ADEQ response

ADEQ does not have authority under the APP program to evaluate or regulate the Town's capacity to provide services. Florence Copper's contingency plan demonstrated compliance with APP requirements to address emergency situations including local, state and federal emergency notifications and response resources. The Emergency Planning and Community Right to Know Act (EPCRA), administered by US EPA, requires industrial facilities to coordinate with state and local governments for emergency planning.

59.11. Increased transportation of chemicals and supplies for the project will increase heavy truck traffic on Hunt Highway, necessitating additional road repairs and maintenance.

ADEQ response

ADEQ does not have authority under the APP program to evaluate or regulate transportation issues. Concerns about transportation issues may be addressed by the state Department of Transportation (azdot.gov) or the County Public Works Department (pinalcountyz.gov/publicworks).

59.12. If a release occurs from an impoundment, pond or injection/recovery well that contaminates the soil or groundwater, the permit only requires a corrective action plan within 60 days. Why isn't there already a plan in place before any such event occurs or why wouldn't a plan be required almost immediately?

ADEQ response

Florence Copper has a contingency plan that describes the appropriate response to types of scenarios mentioned in the comment (Application Attachment 13). The contingency plan indicates that immediate action will be taken to address unauthorized releases to the environment. Permit Sections 2.6.3.1 through 2.6.3.5 include contingency requirements for specific Discharge Limitations Violations, including liner failure, containment structure failure, overtopping a surface impoundment, slope or berm failures, and unexpected loss of fluid in the injection/recovery wells. These permit sections require the permittee to cease discharges to the failed facility and take actions to contain the unauthorized discharge. The permit requires 24-hour notice to ADEQ and 30-day follow-up reporting on the containment actions thus far implemented. The permit requires follow-up investigation of the soil/water impacted and a corrective action plan to mitigate the impacts and prevent future occurrences within 60 days. This plan must be reviewed and approved by ADEQ.

59.13. If hydraulic control is lost during the injection and extraction process, due to malfunction of well equipment, delays in the shutdown rinsing process, loss of power or breaches in the well shaft, the sulfuric acid solution including other heavy metals and radionuclides could migrate into the drinking water aquifer. What warnings and notifications are required in these instances?

ADEQ response

The permit requires Florence Copper to monitor hydraulic control daily through several different measurements including comparison of injection rate vs. recovery rate, water level comparison between recovery wells and POC wells, and fluid electrical conductivity. The permit requires monthly preparation of groundwater contour maps (potentiometric surface maps) using water levels measured at various wells throughout the wellfield to show that the hydraulic control is maintained. The permit requires quarterly monitoring for potential movement of solutions above the Oxide Unit by measuring the electrical conductivity of the groundwater using Annular Conductivity Devices. These BADCT monitoring requirements are in permit Table 15 and any exceedance of permit alert levels trigger contingency actions specified in permit Section 2.6, which include notifications to ADEQ and mitigation requirements.

59.14. Financial analysts that cover Taseko, the parent company of Florence Copper, have written that the necessary funding for the commercial operation has not been obtained. Why wouldn't ADEQ require that funding for the operation be secured before the project commences? Without adequate funding to operate the project, maintaining the necessary safeguards for the aquifer would be jeopardized.

ADEQ response

The APP financial capability demonstration rule (A.A.C. R18-9-A203(B)) requires a letter signed by the chief financial officer stating that the applicant is financially capable of meeting the costs described in A.A.C. R18-9-A201(B)(5). These costs include facility construction, operation, maintenance, closure and post-closure. Florence Copper provided the required letter from Stuart McDonald, Chief Financial Officer, dated June 12, 2019, thus meeting the regulatory requirement. The regulations do not require additional financial capability documentation for construction and operation; however, a financial mechanism is required to demonstrate

financial capability for closure and post-closure costs. It is this financial mechanism that would be utilized to close the facility if the permittee was unable to meet permit requirements for operation.

59.15. The draft permit assumes a \$29 million-plus financial assurance to the EPA would be sufficient, but the EPA has not approved this figure and has not even issued a draft permit yet. How can ADEQ issue a permit that ostensibly relies on an assurance that has not yet been provided?

ADEQ response

ADEQ reviewed the cost estimates for closure and post closure as required by A.A.C. R18-9-A201(B)(5). Permit Section 2.1.2 describes the costs and financial demonstration as follows:

The estimated closure and post-closure cost is \$34,468,500. The cost estimate is based on the list of discharging facilities in Section 2.1, with a maximum of 462 ISCR wells in operation at any time and five water impoundments (BHP Copper Evaporation Pond and 4 new Water Impoundments) at any time. If the number of wells or water impoundments exceed these numbers, the cost estimate and financial capability demonstration shall be updated. The financial assurance mechanism was demonstrated through a performance surety bond held by ADEQ in the amount of \$4,696,000 (A.A.C. R18-9-A203 (C)(2)), and through a financial mechanism to be payable to the U.S. Environmental Protection Agency (EPA) Underground Injection Control (UIC) program in the amount of \$29,772,500 (A.A.C. R18-9-A203(G)). The UIC financial mechanism shall be in place prior to discharge under this permit, in accordance with timeframes specified in the Compliance Schedule of this permit, Section 3. Compliance Schedule Item 3 requires the following documentation prior to discharge to the commercial well field:

The permittee shall submit documentation for the financial assurance mechanism provided to the U.S. EPA for the Underground Injection Control (UIC) permit for this facility.

Permit Section 2.1.2 requires that the permittee maintain financial capability throughout the life of the facility. Therefore, if the EPA determines that their financial capability bond amount does not equal \$29,772,500, Florence Copper must update the Aquifer Protection Permit financial mechanism to meet permit requirements. These permit conditions are necessary because the permitting process for the APP must proceed independently from the EPA permitting process and cannot be made to wait for the EPA permit to issue. Pursuant to A.A.C. R18-9-A213, the ADEQ Director can revoke Florence Copper's permit for failure to meet its financial capability requirements. Finally, the permit requires updated cost estimates and associated financial assurance every six years.

59.16. The draft permit doesn't require reporting of exceedances for five days. Why aren't there provisions in the permit requiring that the public and local government officials be alerted immediately if an exceedance occurs?

ADEQ response

APP reporting requirements are based on A.A.C. R18-9-A207(A), which require notification of ADEQ within 5 days after becoming aware of a violation of a permit condition or that an alert level was exceeded. The Emergency Planning and Community Right to Know Act requires an immediate verbal communication in the event of a release of a hazardous substance, followed by a written follow-up report.

59.17. Some of the verbiage in the draft permit is tied to requirements of the State leased land and not to the commercial site. Why is this?

ADEQ response

The arsenic alert level was originally calculated based on the primary MCL for arsenic and a Use Protection Level (UPL) to be applied at the corner of the State Lease land. The draft permit has been revised to eliminate this language. See response to comment #64.16.

59.18. The property on which the commercial operation is proposed is not zoned for mining. There is ongoing litigation regarding whether or not Florence Copper has a legal, non-conforming right to operate on the property. Why would ADEQ issue a permit when the outcome of the litigation has not been determined?

ADEQ response

The APP statute (A.R.S. 49-243.O) and rules (A.A.C. R18-9-A201(B)(3)) require an applicant to submit evidence that the facility complies with applicable municipal or county zoning ordinances and regulations. ADEQ is aware of the litigation between Florence Copper and the Town of Florence. In that litigation, the Arizona Superior Court ruled that Florence Copper is allowed to engage in in-situ copper mining on the property as a non-conforming use pursuant to a Development Agreement that the Town of Florence entered into with Florence Copper's predecessor-in-interest. That ruling is currently the law of the case. Therefore,

ADEQ will continue with the permit issuance process unless a higher court overturns the Superior Court's ruling before the permit is issued. The permit Compliance Schedule has been updated to require Florence Copper to notify ADEQ of any zoning change that would impact Florence Copper's right to operate; ADEQ would then take appropriate action to revise or revoke the permit to meet the changed condition.

59.19. This is a controversial issue. If the permit is issued, how will residents and government officials be able to monitor the required reports submitted to ADEQ? Why wouldn't ADEQ require that Florence Copper, if it is to be transparent, make all of the reports that are submitted to ADEQ available to the general public in a timely way?

ADEQ response

ADEQ receives groundwater point of compliance monitoring data electronically which allows immediate identification of alert level or aquifer quality limit exceedances. The pre-operational reports required by the permit will be submitted for approval prior to operation. ADEQ will expend the resources to review the reports in a timely manner. All reports submitted to ADEQ are public records that any member of the public may request from ADEQ. Pursuant to Arizona's Public Records Law, A.R.S. § 39-121.01(D)(1) ADEQ is required to promptly produce such reports to the requesting party. ADEQ does not have the authority to require Florence Copper to provide the public direct access to reports.

59.20. It appears from the draft permit that ADEQ only requires that Florence Copper submit written reports after the operation begins. Will ADEQ employees ever visit the site to ensure that Florence Copper is fully complying with the terms of the permit?

ADEQ response

The permit requires Florence Copper to submit written reports at several different times, including prior to operation (Permit Section 2.7.4.3), not just after operation begins. ADEQ will visit the site at various times such as in response to complaints, to observe mechanical integrity testing of wells, and to perform periodic inspections at the facility, per A.R.S. §§ 41-1009 and 49-203(B).

59.21. My overarching concern regarding approval of the Aquifer Protection Permit for the commercial operation is for the safety of our drinking water and the negative impact the project will have on the area. Many residents of Florence support the commercial operation and the economic impact and jobs that might be created. They believe the process is completely safe, all potential risks have been mitigated and ADEQ and the EPA will protect us. While I hope and pray this is true, there are many examples of failed projects that have been deemed "safe". I believe the risk to the drinking water aquifer shared by residents north of the proposed operation is too great to completely ignore. I would appreciate receiving specific (not boilerplate) responses to each of my questions.

ADEQ response

ADEQ has addressed each comment numbered 59.1 through 59.20, above.. With regard to contingency actions, see responses to comments, 59.9, 59.12 and comment 68.83.

#60 Arne and Judy Hawkins: The commenter submitted a letter dated October 2, 2020:

60.1. Here are our concerns with the proposed permit to allow Florence Copper to commercially mine copper within the Town of Florence city limits. The permit allows Florence Copper to greater than 10,000,000 gallons per day of daily influent or discharge of pollutants per day! That is correct, over ten million gallons of influents or discharge which of course means the liquid used for this purpose comes from the water table. Without water, there would be no influents or discharge. When Arizona and the southwest is experiencing the worst drought in history, this is the last thing Arizona needs. The water table where we get our drinking water is already at a point that makes it impossible to serve the growth of Pinal County and the Town of Florence while Florence Copper is taking such a huge amount for mining operations. The permit is for the life of the project, so what happens to the planned growth of residential and small commercial activity that is already planned for this area? No one has addressed the huge amount of water required for this mining operation.

ADEQ response

See ADEQ response to Comment #59.9.

60.2. According to the USGS, there has not been one, yes, not one commercial copper mining operation of any kind that hasn't had a negative impact on the water supply after the mining operations ceased. What protects Florence and Pinal County from the same fate? The assurance of Florence Copper and the ADEQ doesn't protect anyone if there is an impact on our water. Who will provide this entire area with clean and pure drinking water for the existing residents and the planned growth of the area if our water is contaminated?

ADEQ response

The permit requires contingency actions in response to permit limit exceedances. See responses to comment 59.12 and comment 68.83.

60.3. The permit allows for Florence Copper to drill up to 1900 wells during the life of the project. Besides the obvious noise and intrusion on the proposed residential development in the area, there are already hundreds of test wells that were drilled prior to Florence Copper by the now defunct BHP project. How does Florence Copper plan to avoid both sulfuric acid and other heavy metals to leak into these wells and contaminate the water supply?

ADEQ response

Permit Sections 2.7.4.2.2 and 2.7.4.3, and Compliance Schedule Item #5 require that Florence Copper submit a pre-operational report that documents borehole and well abandonment within 500 feet of the ISCR well area. The report must be submitted to ADEQ for approval prior to operating in each ISCR well block. By properly abandoning the boreholes and wells, Florence Copper will prevent movement of injected solutions through the holes and wells.

60.4. How can Florence Copper be issued a permit including commercial operation when they have only operated under a temporary permit for two years and have not even supplied a report showing their successful and safe operation of the test, including the impact of the test on our water supply? How can ADEQ issue a permit without this critical information?

ADEQ response

See ADEQ response to Comment #59.6

60.5. Florence Copper proposes to use the permit to conduct commercial operation on land they own but that is not zoned for commercial mining. How can ADEQ issue a permit on land that is not zoned for commercial mining?

ADEQ response

See response to comment 59.18

60.6. The permit allows for adding impoundments that use blowers to spray processed water to speed up evaporation. When this happens, the water blows outside the containment area and could negatively impact both the soil and eventually the water table. Is this water tested before or after blowing into the air to ensure that it doesn't contain harmful amounts of chemicals or other materials that would impact our water supply?

ADEQ response

Sections See response to comment 59.5

60.7. What happens if we receive our normal amount of rain during the monsoon seasons and flooding occurs within the operation? How does Florence Copper plan on not allowing this flood water to pick up chemicals or other material including heavy metals and eventually drain into the Gila River?

ADEQ response

See response to comment 59.7.

60.8. What oversight is planned by the ADEQ to ensure that Florence Copper actually operates in accordance with the permit and reports any unplanned release in the proper time period?

ADEQ response

ADEQ will perform periodic inspections, inspections in response to complaints and in response to unplanned releases to the environment. During inspections, ADEQ reviews operational records and confirms that the appropriate notifications have been made in response to permit requirement exceedances. ADEQ will take appropriate compliance action for failure to comply with permit conditions including the notification requirements. ADEQ will review monitoring data including groundwater data, BADCT monitoring data, and pre-operational, annual and quarterly reports; see permit Section 2.7 for full list of reporting requirements.

60.9. The time frame within which to initiate remediation of exceedances is much too long, currently set at 60 days.

ADEQ response

See response to comment 59.12

60.10. Please consider our concerns over the proposed permit of commercial operations of in-situ mining within the Town of Florence and the potential impact on our water supply.

ADEQ response

Comment noted. Please see responses to comments 60.1 through 60.9.

#61, Ferdinand and Audrey Sobota: The commenter submitted a letter dated September 24, 2020.

61.1. My husband and I are very upset about the proposed issuance of Individual Aquifer Protection Permit No. 101704 LTF 76820 to the Florence Copper Project. We believe ADEQ is putting our health at risk by proposing to issue this permit. If our water is contaminated by FCI processes, and ADEQ provided the means for them to accomplish this, how does ADEQ propose to provide clean water to the residents that rely on this aquifer?

ADEQ response

The permit requires contingency actions in response to permit limit exceedances. See response to comment 68.83

61.2. ADEQ issued a temporary permit for a pilot test eighteen months ago permitting Florence Copper to conduct a pilot test on the 160 acres of State land that is technically not considered to be within the Florence Town Limits. There is a parcel of 1,182 [acres] that Florence Copper owns, but is not zoned for mining. The issue of the zoning for that property is with the Arizona Court of Appeals. Why would ADEQ circumvent the legal system and issue a permit to mine that land?

ADEQ response

See response to comment 59.18

61.3. In the ADEQ draft summary, V. Regulatory Status, it states FCP is currently in compliance with the existing permit. I do not think it has been two years since the temporary permit was issued to Florence Copper Project, so how could ADEQ evaluate the facts from the pilot project? Has the data been received by ADEQ for the two-year period that the temporary commercial operation permit was issued? If not, why would ADEQ issue a permanent permit based on modeling and not actual fact?

ADEQ response

See ADEQ response to Comment #59.6

61.4. Has ADEQ addressed the issue of Florence Copper using blowers to speed up the evaporation of the process water that spew the process water into the air and over the embankment when the wind is blowing? Is the process water being tested before the blowers are turned on?

ADEQ response

See ADEQ response to Comment #59.5

61.5. One of the issues we see as a real problem is the amount of water it will take to run this project. Arizona has been in a drought situation for several years. Why exacerbate that situation by approving a process that will use so much water?

ADEQ response

See ADEQ response to Comment #59.9.

#62, Skip Daum: The commenter submitted an email dated September 11, 2020.

Q 1: Will FC share a portion of the value of the extracted copper to the town, and if so, what percentage? Will that percentage change over time?

Q 2: What type and amount of tax will be levied upon FC?

Q 3: When will any tax be levied?

I will await your answer in the written report. Thank you.

ADEQ response

ADEQ does not have authority under the APP program to evaluate any financial agreements between Florence Copper and the Town of Florence, or tax requirements.

#63, Art Clements: The commenter submitted an email dated August 9, 2020.

Any luck getting the acid from Mexico?

When might production start?

How much effect is Covid having on the start up plans?

ADEQ response

ADEQ does not have authority under the APP program to evaluate contracts regarding materials or supplies or the impact of the Covid 19 situation. The pre-operational terms of the permit must be met prior to starting ISCR operation. At this time, ADEQ is not aware of Florence Copper's estimated start time.

#64. Barbara U. Rodriguez-Pashkowski on behalf of the Town of Florence: The commenter submitted the three letters dated August 11, 2020, October 9, 2020 and October 12, 2020. ADEQ has added numbering to the comments (1 through 59).

August 11, 2020 Town of Florence Letter

64.1. While monitoring the ADEQ's website, the Town of Florence discovered that on August 6, 2020, ADEQ issued the draft Significant Amendment to APP P-101704 and set a public comment deadline of September 11, 2020. In light of the scope and technical complexity of this commercial mining permit along with the significant amount of technical documents and data associated with the permit, the Town requests that ADEQ extend the comment period by 90 days. It took ADEQ well over a year from the submittal of the permit application to issue the draft permit. During that period of time, a large volume of technical documents and data were provided to ADEQ by Florence Copper, Inc. and its consultants. Providing the public with only 36 days to review the draft permit and the relevant technical documents/data, so as to be able to provide meaningful comments, is not feasible. In order to ensure that the permit is the most protective of human health, the environment, and the Town's drinking water resources, a 90-day extension of the public comment period is reasonable and warranted.

In addition, granting the extension and moving out the public hearing will also allow those citizens who may want to participate but may not have the means or access to the electronic equipment necessary to participate in an electronic public meeting, to make arrangements to do so; or, by that time, the CoVid situation may be at a point where a true public meeting can be safely held. Furthermore, Florence Copper Inc. will not be harmed by the requested extension as it cannot commercially mine without the federal UIC permit which has not yet been issued. According to EPA, it is optimistic to expect that the UIC permit will be issued in 2020. In the interest of fairness, the spirit of cooperation to fulfill the meaning of true public participation, and; more importantly, to ensure the permit is the most protective, the Town requests that ADEQ grant a 90-day extension to the public comment period and that the public hearing be reset accordingly.

ADEQ response

ADEQ determined that an additional 30 days would allow sufficient time for public review and input as part of the public comment period specified in rule (A.A.C. R18-9-109). Further, ADEQ determined that changing the public hearing date could be problematic if people who read the original public notice and hearing date did not read the second public notice that extended the comment period. Therefore, ADEQ decided to hold the hearing on the originally published date. The second public notice re-iterated the public hearing date to avoid any miscommunication or confusion. Both public notices included a phone number to contact ADEQ if technical assistance was needed, as follows:

"If you wish to verbally comment during the hearing but do not have access to a computer and internet service, please call Mike Sonenberg, ADEQ Unit Manager, at 602 771-4106, at least 48 hours prior to the hearing for assistance."

All interested parties who were still in the process of reviewing the permit on the hearing date, September 9, 2020, still had the opportunity to submit written comments until the public comment deadline of October 12, 2020. All comments received during the public comment period, whether written or verbal, are considered by ADEQ as required by rule.

October 9, 2020 Town of Florence Letter

On this date, October 9th, 2020, the Town of Florence submits its comments to both the *Draft Executive Summary* and the *Draft Aquifer Protection Permit NO. P-101704, Place ID 1579, LTF 76820, Significant Amendment* ("Draft APP"), which the Arizona Department of Environmental Quality (ADEQ) intends to issue to Florence Copper, Inc. ("FCI"). It is our sincere hope that ADEQ reviews these comments with objectivity, a desire to comply fully with Arizona law and to address in advance those concerns most important to the citizens of Florence as stated in the comments below.

I. COMMENTS ON THE DRAFT EXECUTIVE SUMMARY:

64.2. Knowing that there are many interested parties, most who do not have the resources or the technical or legal expertise to analyze the highly complex Draft APP, ADEQ, in its Draft Executive Summary, should strive for complete transparency. The Draft Executive Summary, should be revised to provide the public with sufficient information so that one gets a clear understanding of the scope of the commercial mining project, the planned use of harmful chemicals, the projected mining timeframe which includes the closure/post closure activities, the impact the mining operations and use of sulfuric acid injected into the aquifer will have on the Town's drinking water, the impact to the Town's infrastructure, i.e., mining equipment being driven over Town roads, the fact that the mining operations will be constructed in blocks over an approximate 20 year period, and the impact to historical and cultural resources, just to name a few of the critical issues. Providing that detail is necessary to allow meaningful comment from the public who will be directly affected by the proposed mining operations.

ADEQ response

The executive summary describes the in-situ mining process, including the wells and acid used to extract copper. At this time, it is expected that copper recovery (i.e. injection and recovery) will proceed for approximately 22 years based on current planned well block development. During this time, well blocks will go through closure rinsing as the extracted copper falls below acceptable concentrations. When the last well block falls below acceptable concentrations, it will be rinsed for two years, which translates to 24 years to the end of closure activities, at which time post-closure activities will commence. These timeframes are approximations, since the actual amount of copper available for extraction and the time needed to extract the copper, could vary. Because the APP rules indicate that the permit is issued for the life of the facility, ADEQ has not established timeframes for the operations in the permit (A.A.C. R18-9-A213).

The facility is designed to protect the Town's drinking water supply and the permit conditions and monitoring are designed to provide oversight to assure drinking water protection.

ADEQ does not have authority under the APP program to evaluate several of the criteria you have commented on, including historical and cultural values and impact on the Town's infrastructure and roads.

64.3.a. Types of Wells: FCI proposes to install or continue to operate a variety of wells, including, injection, recovery, perimeter, observation, monitoring, POC ..., a brief explanation of the purpose of each well would be useful to those trying to understand a very complicated permit.

Section III:

64.3.b. 1st Paragraph: To understand the full impact of the proposed commercial mining project, and in the interest of complete transparency, ADEQ should include the number of wells that will be install at this site. Furthermore, ADEQ should also disclose the effect the injection of sulfuric acid will have on other metals in addition to the copper.

64.3.c. 1st Paragraph, 2nd sentence: ADEQ states, *The copper recovery process involves injection leach solution (lixiviant) into the ore body...* In the interest of full transparency, ADEQ clearly explain what "lixiviant" is, what its chemical makeup includes, and should identify the primary chemical/pollutant to be used by FCI in its leaching process, sulfuric acid. And, should also disclose the health risks associated with lixiviant/sulfuric acid.

ADEQ response to 3.a., 3.b., and 3.c.

The executive summary provides sufficient information to understand the operations of the facility and how the aquifer protection program will ensure the groundwater is protected. Additional information is included in the APP application, which is available to the public by making a records request through the ADEQ Records Center.

64.4. 2nd Paragraph: Over the last few years there has been increased concern over the dwindling availability of groundwater in eastern Arizona and, specifically in Pinal County, for domestic and agricultural uses: The concern stems from the long term drought that has plagued our state and over pumping of the aquifer. It is important for the public to understand the amount of groundwater that will not only be used over the course of this proposed mining operation, but, more importantly, the amount of groundwater that will be lost through reuse and evaporation. Please quantify that loss for the public's consideration.

ADEQ response

See ADEQ response to Comment #59.9.

64.5. 2nd Paragraph, Last sentence: ADEQ states, *Rinsing will be conducted in the same sequence in which the wells are taken out of service and shall commence within 6 months of a well being taken out of service, subject to a sufficient number of wells available to effectively rinse the mined area.* Please provide an explanation on how it is determined that "a sufficient number of wells [are] available to effectively rinse the mined area." If a "sufficient number of wells" are not available; please explain the impact to the aquifer, i.e. contaminants remain in the groundwater for longer periods of time and have the potential to migrate beyond the capture/recovery zone.

ADEQ response

See ADEQ response to Comment #68.27.

64.6. 3rd Paragraph, 2nd Sentence:

ADEQ states, *Rinsing is estimated to begin in year 5 of ISCR operations...*

Please explain how far the contaminants will travel during the 5 year period.

ADEQ response

The commenter has misinterpreted the permit requirement. The ISCR operation must maintain hydraulic control during injection and recovery, through the end of rinsing, until the wells are abandoned. The permit requires monitoring to demonstrate that hydraulic control is maintained and pollutants remain within the pollutant management area (PMA). Therefore, the contaminants are not expected to travel out of the PMA during the 5 year period.

Section IV

64.7. Item numbered 2: ADEQ states, *[I]ncorporate data and information generated during the construction and operation of the PTF.* When the Temporary APP was issued for the PTF, the stated purposed of the PTF was to generate the data necessary for the regulatory agencies to analyze to determine whether commercial mining could be conducted in a manner that was safe and protective of the public health and welfare and the environment. It appears, instead, that rather than complete the PTF and gather all the data from the PTF operations, FCI is requesting a permit to allow full scale commercial mining and wants to roll into the commercial permit the PTF project. Please explain how ADEQ can determine whether full scale commercial mining is safe and protective of the public health and welfare and the environment when the PTF project has not been completed?

ADEQ response

See ADEQ response to Comment #59.6

64.8. Item numbered 7: ADEQ is using BADCT elements from another permit, APP 106360. In the interest of complete transparency, ADEQ must provide a detailed description of those BADCT elements for the public's review and consideration.

ADEQ response

Permit Sections 2.2 and Table 6 provide the updated BADCT requirements. The executive summary does not repeat the permit requirements; however, the executive summary provides a brief overview in Section VI.

64.9.a. Item numbered 9: Identify which two Point of Compliance wells have gone dry; and, where will the replacements be located?

64.9.b. Item numbered 10: Explain why the Discharge Impact Area being revised?

64.9.c. Item numbered 11: Explain what it means to "reset selected alert levels", why they are being reset, and which alert levels are being reset.

ADEQ response to 9.a., 9.b., and 9.c.

It is neither required by rule nor feasible, for an executive summary to provide details on all aspects of the facility. This information is included in the APP application, which is available to the public by making a records request through the ADEQ Records Center.

As described in Florence Copper's application Attachment 12, two of the existing POC wells (M32-UBF and M33-UBF) have gone dry due to depletion of the regional water table. M32-UBF is currently located within the proposed PMA near the PTF processing facility. M33-UBF is currently located outside the PMA approximately 1,000 feet northeast of the PTF Water Impoundment. Florence Copper proposes that these wells be abandoned and replaced as follows: replace POC well M32-UBF with a new POC well re-located to be adjacent to the proposed Water Impoundment 4; replace POC well M33-UBF with a new POC well re-located to be adjacent to the proposed PLS Pond.

As described in Florence Copper's application (including Florence Copper's April 6, 2020 email and attachment), the DIA has been revised to include the ISCR Well Field, the pregnant leach solution (PLS) pond, raffinate pond, runoff pond, and water impoundments.

The following proposed alert level (AL) revisions are provided in Exhibit 15-1: revise the AL for sulfate in M1-GL to account for natural changes to the groundwater conditions, and revise ALs based on the current permit-described methodology which sets a minimum alert level at 80% of an aquifer water quality standard (AWQS). Florence Copper proposed a revised AL for sulfate at POC well M1-GL because of a slowly increasing trend since 1995. The increasing trend does not appear to be caused by any known discharge at the site and is up gradient or cross gradient of the discharging facilities previously constructed and operated by BHP Copper. ADEQ concurs with the rationale for establishing the revised AL. Note that the revised AL of 184.2 mg/l is within the range of ALs established at the other POC wells and less than the secondary MCL of 250 mg/l. The amendment of ALs for parameters with AWQS values is proposed in order to bring the existing AL values in-line with current ADEQ procedures.

Section VI:

64.10. Maintaining hydraulic control of pollutants injected into the aquifer is a highly technical and complicated process. Please explain how allowing BADCT based on averages ensure that all pollutants will be captured and not escape the cone of depression that is the approved control technology. In the event the technology fails, what action will FCI be required to take to abate all excursions of contaminants?

ADEQ response

The permit requires monitoring for hydraulic control at varying frequencies based on the type or parameter monitored. As described in the executive summary, the daily average for several parameters must meet performance criteria. Failure to meet criteria triggers permit contingency actions to determine and address the cause. These multiple monitoring techniques collectively provide an indication of whether hydraulic control is maintained. The fact that some of the monitoring and limits depend on average values rather than discrete values does not diminish their effectiveness. See response to comment 59.12, 59.13 and 68.83 for contingency actions required by the permit.

Section VII:

64.11. Pollutant Management Area (PMA), 1st Paragraph: Include the distance from the PMA to the Point of Compliance (POC) wells, and the expected travel time from the PMA to each POC wells.

ADEQ response

It is neither required by rule nor feasible, for an executive summary to provide details on all aspects of the facility. This information is included in the APP application, which is available to the public by making a records request through the ADEQ Records Center.

The PMA and POC locations are shown in the APP application Figure 12-1 and described in Attachment 12, Section 12.4 and 12.3, respectively. The PMA circumscribes the water impoundments and process ponds, and the horizontal space beyond the edge of the planned ISCR well field which contains the central portion of the cone of depression which is the barrier for the ISCR operations. The proposed PMA is formed by a line narrowly drawn to connect the outline of the planned water impoundments, proposed PLS pond, proposed raffinate pond, proposed runoff pond, existing BHP water impoundment, existing PTF water impoundment, existing PTF runoff pond, and a line connecting existing POC wells encompassing the planned ISCR well field. The existing PTF well field is located entirely within the planned ISCR well field and is consequently within the PMA line circumscribing the planned ISCR well field. The POC wells are located at the edge of the PMA as shown in Figure 12-1. The PMA is defined by statute (A.R.S. §49-244.1) and the POC locations are based on the PMA and the downgradient groundwater flow direction, not travel time from the PMA to the wells (A.R.S. § 49-241). The POC locations meet the statutory requirement, and ADEQ did not require Florence Copper to calculate travel time from the PMA to the POC wells.

64.12. Discharge Impact Area, 2nd Paragraph: Identify the modeling system that was used by FCI, who conducted the modeling, and the date that the modeling was conducted. Also, did ADEQ run its own modeling or did it rely on the results from FCI's model?

ADEQ response

It is neither required by rule nor feasible, for an executive summary to provide details on all aspects of the facility. This information is included in the APP application, which is available to the public by making a records request through the ADEQ Records Center.

The DIA groundwater model was developed and documented in a hydrogeologic study for the application for the PTF temporary APP by a precursor to Florence Copper (Curis Resources). This original model was reviewed by the U.S. EPA and used to assess the hypothetical, potential discharge impact resulting from the PTF operation. The original model was updated by Haley and Aldrich, Inc., and the results documented in a technical memorandum dated June 12, 2019, provided as APP application Exhibit 14-10. ADEQ thoroughly reviewed the model methodology, input parameters and results; ADEQ did not perform additional modeling.

64.13. 3rd Paragraph: Leave aside the statement that, no constituent other than sulfate will migrate to the POC after cessation of ISCR operations ..., if sulfate does migrate beyond the ISCR well field, what will be done to ensure that the sulfate will be fully remediated, so that once the site is closed, the citizens who rely on the aquifer will not be harmed? What is the basis for the statement that, no constituent other than sulfate will migrate? How do you ensure that no other constituent will migrate to the POC?

ADEQ response

See response to comment 68.54.

Additionally, site restoration activities consist primarily of rinsing of the ore body after ISCR operations have ended using formation water and/or treated water to remove residual solution and associated constituents. The rinsing phase will be followed by the addition of amendment compounds (sodium bicarbonate and ferric) that will restore the buffering capacity of the formation and reduce the solubility of the remaining mineral constituents. During restoration, rinsing and the addition of buffering amendments will result in the pH of the residual fluids rising to the point that it is near background levels. As the pH rises, dissolved mineral constituents and metals will combine with mineral material to precipitate out of solution in insoluble forms. Geochemical modeling presented in Application Attachment 10 has demonstrated that due to the buffering capacity of the formation surrounding the ISCR well field, no constituent other than sulfate will migrate to the POC after cessation of ISCR operations. Geochemical modeling of post-production rinsing to the target level of 750 mg/L sulfate will likely remove other constituents of interest to near background concentrations or below AWQS.

Permit Section 2.9.1.1 requires sampling of wells for Table 14 parameters once the pH and sulfate meet rinsing standards. If the results of the sampling show concentrations of parameters greater than the AWQS and or greater than the pre-determined mine block concentrations, then rinsing operations will continue until all compounds are below AWQSs or predetermined mine block concentrations.

64.14. Hydrology: It appears that ADEQ omitted one critical fact regarding the hydrological makeup of the aquifer. The LBFU is that portion of the aquifer where the citizens of Florence extract their drinking water. Because of the connectivity between the LBFU and the Oxide Unit, if FCI loses hydraulic control of the pollutants it injects into the Oxide Unit, the Town's drinking water is at risk for being polluted and becoming undrinkable. This risk is exacerbated by the fact that in the downgradient flow direction, the LBFU spills over and goes lower than the Oxide Unit making the LBFU more susceptible to contamination. This information must be fully disclosed in the Draft Executive Summary.

ADEQ response

Pursuant to A.R.S. § 49-224(B), all aquifers are drinking water aquifers, and must be protected for that use. The permit requires the facility to meet aquifer water quality standards at the points of compliance in all the aquifers potentially impacted by the facility, including the LBFU. The monitoring well system accounts for the site specific geology and includes wells screened in each of the aquifers (UBFU, LBFU, and Oxide Unit).

See also response to comment 68.44.

64.15. Point(s) of Compliance: What is the estimated travel time to each POC well?

ADEQ response

See response to comment 64.11.

64.16. Additional Groundwater Monitoring: What is the Aquifer Quality Water Standard and the drinking water standard for arsenic? If either is more restrictive than the use protection level, why is ADEQ allowing a less restrictive standard?

ADEQ response

The AWQS for arsenic is 0.05 mg/l and the drinking water standard is 0.01 mg/l. ADEQ has established a use protection level (UPL) for arsenic of 0.01 mg/L, which is consistent with EPA's revised primary drinking water standard for arsenic.

The draft permit included contingency requirements for four POC wells based on a use protection level (UPL) for arsenic of 0.01 milligrams per liter (mg/L), consistent with EPA's primary drinking water standard for arsenic. The draft permit designated the four wells based on their location at the northwest corner of the State Lease Land, which was downgradient of the Florence Copper Production Test Facility (PTF). ADEQ has revised this commercial APP to require the arsenic UPL contingency actions for all POC wells downgradient of the ISCR Area; revision have been made to permit Section 2.6.2.5.3: Alert Levels to Protect Downgradient Users from Pollutants Using a Narrative Aquifer Water Quality Standard.

The arsenic alert level was calculated based modeling that showed arsenic would not exceed the 0.01 mg/l UPL at the northwest corner of the State Lease Land as long as it didn't exceed 0.26 at the POC wells. The arsenic UPL analysis was provided as part of the PTF pre-operational report. The UPL and associated arsenic alert level of 0.26 mg/l have been incorporated into this commercial APP. Typically, the POC well arsenic alert level would be set at 80% of the AWQS (i.e. 0.04 mg/l); therefore, in applying the lower alert level of 0.26 mg/l, the permit is more protective of the aquifer. The permit language has been revised to reflect that the arsenic UPL and alert level are applicable to 18 additional wells (permit Section 2.5.7).

64.17. Zoning: An imminent decision from the Arizona Court of Appeals in Town of Florence v. Florence Copper, 1 CA-CV 19-0504 will determine whether FCI has the legal right to mine on its property. This Executive Summary and the Draft APP do not discuss FCI's responsibilities should it lose the litigation and, consequently, its right to mine due to its failure to comply with the Town of Florence's zoning ordinance.

ADEQ response

See response to comment #59.18.

II COMMENTS ON THE DRAFT AQUIFER PROTECTION PERMIT NO. P-101704
SIGNIFICANT AMENDMENT

64.18. Title: Is the Draft APP identification information correct? Is the licensing timeframe number 78620 or 76820?

ADEQ response

The correct licensing timeframe number is 76820. The error will be corrected.

64.19. Section 2.1, Facility/Site Description, Groundwater Use: From what location will FCI extract groundwater for use in the production of lixiviant? From what location will FCI extract groundwater for use in the rinsing operations? From what location will FCI extract groundwater for use to assess and maintain the hydraulics of the injection and recovery patterns, assessing the performance of surface related facilities and rinsing operations (Section 2.2.4, #3)? Depending on the location of wells used to extract the fresh groundwater, what effect will that pumping have on the containment of the contaminants injected into the aquifer? Also, explain how that determination was made.

ADEQ response

See response to comment numbers 68.19 and 68.20.

64.20. 1st Paragraph: Of the 1,765 injection and recovery wells, how many are injection wells? Also, what is the ratio of recovery wells to injection wells in a resource block?

ADEQ response

The injection and recovery wells will be used for both injection and recovering during the ISCR operation. The typical operational method will use a "five-spot" approach, with one Injection well surrounded by four recovery wells. This pattern will be repeated throughout the resource blocks.

64.21. 2nd Paragraph: Over the last few years there has been increased concern over the dwindling availability of groundwater in eastern Arizona and, specifically in Pinal County, for domestic and agricultural uses: The concern stems from the, long term drought that has plague our state and over pumping of the aquifer. It is important for the public to understand the amount of groundwater that will not only be used over the course of this proposed mining operation, but, more importantly, the amount of groundwater that will be lost through reuse and evaporation. Please quantify that loss for the public's consideration.

ADEQ response

See ADEQ response to Comment #59.9.

64.22. 3rd Paragraph: Please provide an explanation on how it is determined that *a sufficient number of wells {are} available to effectively rinse the mined area*. If a "sufficient number of wells" are not available, please explain the impact to the aquifer, i.e., contaminants remain in the groundwater for longer periods of time and have the potential to migrate beyond the capture/recovery zone.

ADEQ response

See response to comment #68.27. Because hydraulic control must be maintained during this period, pollutants will be contained within the well field and will not migrate beyond the capture zone.

64.23. 4th Paragraph: ADEQ states that, *Rinsing will continue 1 year beyond the end of copper extraction operations*. Will the rinsing automatically terminate at the end of that 2 year period, or will it be dependent on groundwater quality data collected and analyzed at the end of that 2 year period?

ADEQ response

Rinsing must continue until closure criteria are achieved per Permit Section 2.91.1.

64.24. Section 2.1.2: Is there a difference between demonstrating *financial capability throughout the life of the facility* and what the estimated costs for closure and post-closure are projected for this mining project? If so, how has FCI demonstrated financial capability throughout the "life of facility", and in what amount? The EPA UIC permit has not yet been issued, provide an explanation on how it was determined that a \$29,772,500 financial assurance to EPA is sufficient; and, did EPA approve that amount for the commercial project?

ADEQ response

See response to comment #59.15.

64.25. Section 2.3.2: Based on past inquiries with ADEQ and with Pinal County Air Quality Department regarding FCI's use of the mechanical evaporators, disclosed that neither ADEQ nor Pinal County Air Quality Department had any prior knowledge of FCI's use of those mechanical evaporators. The Draft APP now permits FCI to continue using enhanced evaporation in the PTF Process Water impoundment through the use of mechanical evaporators. We have seen during the PTF project that these large evaporators shoot water from the impoundment high into the atmosphere; what controls does the Draft APP have in place to ensure that FCI is not emitting pollutants into the air? And will ADEQ impose restrictions on the use of the evaporators during windy conditions?

ADEQ response

See response to comment #59.5

64.26. Section 2.3.4: The Draft APP states specifically that the BHP Copper well field cannot be used for injection or recovery of process solutions, but does the Draft APP allow other uses of that well field? If so, what uses, or where the Draft APP are those uses described?

ADEQ response

The draft permit does not allow other uses of the BHP Copper well field. The wells must be abandoned in accordance with permit Section 2.7.4.2.2. and 2.7.4.3.

64.27. Section 2.3.5: same comments as stated above in Section 2.3.2; what controls does the Draft APP have in place to ensure that FCI is not emitting pollutants into the air? And, what restrictions will ADEQ impose on the use of the evaporators during windy conditions?

ADEQ response

See response to comment #59.5.

64.28. Section 2.5.1: The Draft APP states, *Discharge monitoring shall be conducted and reported on a **one time basis** at the PLS Pond, Raffinate Pond, Runoff Pond, BHP Copper Evaporation Pond and each Water Impoundment in accordance with Section 4.2 Table 7: ONE-TIME SAMPLING EVENT - DISCHARGE MONITORING LOCATIONS and for parameters listed in Table 9: DISCHARGE MONITORING SAMPLING PARAMETERS, and the Compliance. Schedule in Section 3.0 in order to allow for accurate representation of process solutions [emphasis added]*, does this "one time basis" provision only require FCI to sample once during the life of the permit, or does it require FCI to sample once during each discharge event?

ADEQ response

The permit requires Florence Copper to sample each pond one time prior to discharging to the pond. There is no ongoing routine discharge monitoring, which is typical for double-lined ponds because any leakage from the top liner is collected and removed by the leak detection system. The contingency requirements of Sections 2.6.3.1 (Liner Failure) and 2.6.3. (Overtopping) require sampling and analysis of pond contents.

64.29. Section 2.5.3 3: Paragraph #1 - if the permittee conducts more than eight sampling events, must the AL be calculated from all sampling events or is permittee allowed to select which eight events it wants to use to calculate the AL parameters?

ADEQ response

The permit requires a minimum of 8 samples for AL calculation. If more than 8 samples are obtained, the additional results may be submitted with the report for ADEQ review and evaluation of the AL calculation method to assure that it meets acceptable professional standards.

64.30. Section 2.5.3.5: As written, this provision only requires the initial groundwater sampling for replacement POC wells upon completion of the ambient groundwater sampling period. This section should be clarified to state that after the initial groundwater sampling for the replacement POC wells, those POC wells will also be required to be sampled quarterly compliance monitoring.

ADEQ response

ADEQ concurs with the commenter and notes that Section 2.5.3.5 requires the replacement wells to commence quarterly sampling upon completion of the ambient monitoring period.

64.31. Section 2.5.3.7: Paragraph #3: if the permittee conducts more than three conductivity measurements; must the AL be calculated from all measurements or is permittee allowed to select which three measurements it wants to use to calculate the AL/BTV?

ADEQ response

The permit requires a minimum of 3 conductivity measurements for AL calculation. If more than 3 measurements are obtained, the additional results may be submitted with the report for ADEQ review and evaluation of the AL calculation method to assure that it meets acceptable professional standards.

64.32. Section 2.5.4: Is surface water monitoring of the Gila River required under some other permit issued to FCI? If so, what type of permit and what is the permit number? If not; please explain how ADEQ can permit a full scale commercial mine located within the flood zone of the Gila River without requiring any surface water monitoring? While that segment of the Gila River may typically be dry, it does flow on occasion. Furthermore, the Draft APP does not address the downgradient flow of the Gila River and the potential impact of contaminated groundwater from the mine to the river.

ADEQ response

See response to comment 59.7 in regard to Florence Coppers's AZPDES Permit. The potential impact to the Gila River from ISCR mining is highly unlikely due to the hydraulic characteristics of the site. The Gila River is an ephemeral losing stream adjacent to the Florence Copper site and therefore hydraulically isolated from the deeper Bedrock Oxide Unit where injection of lixiviant into the ore body occurs. Also noteworthy is the alluvium and basin fill deposits that separate the Gila River from the ore body. These deposits range in thickness from 350 feet to 700 feet (from east to west) across the proposed well field. The Gila River is further protected from ISCR operations by a low permeable aquiclude unit known as the Middle Fine Grained Unit which separates the Gila River alluvium and underlying Upper Basin Fill Unit (UBFU) from the Bedrock Oxide Unit.

The Gila River is also upgradient and sidegradient of the ISCR Flow Field. Groundwater flow directions in the unconfined UBFU, and confined Bedrock Oxide Unit and Lower Basin Fill Unit (LBFU) is towards the northwest. Groundwater modeling indicates that ISCR solutions are unlikely to be transported beyond the ISCR well field during operations (please refer to Response 68.54). The Gila River is further protected by the groundwater monitoring network that surrounds the ISCR well field. For example, ACD monitoring at the Injection, Recovery, Observation and Perimeter Wells will provide early detection of mining solutions should an excursion occur (Please refer to Response 68.42). Therefore, in the event that an excursion is detected the permittee will be required to take the appropriate contingency measure (See Permit Section 2.6.2.8) and/or corrective action (see Permit Section 2.6.6) to prevent the off-site migration of ISCR.

64.33. Section 2.5.7: Is ADEQ applying the same alert level for arsenic at the northwest corner of the FCI private property as is being used for the northwest corner of the State Mineral Lease Land? What is the rationale for only setting an alert level for the northwest corner of the State Mineral Lease Land?

ADEQ response

The arsenic alert level has been established in wells along the north and west sides of the Florence Copper private property downgradient of the ISCR Area. See response to comment #64.16.

64.34. Section 2.6.1: What is the rationale for not requiring the reporting of any AL exceedance, or violation of an AQL, DL, or other permit conditions within 24 hours? Section 2.7.3 provides FCI with five days to report an exceedance or violation. Does the Draft APP not require FCI to conduct verification sampling within a specific period following any AL exceedance, or violation of an AQL, DL, or other permit condition? As this provision is written in the Draft APP, it appears that verification sampling is conducted during the next scheduled round of sampling.

ADEQ response

The permit reporting timeframes are based on APP rule requirements (A.A.C. R18-9-A207). Several permit sections allow the permittee to perform groundwater verification sampling within 5 days of becoming aware of an exceedance (see permit Sections 2.6.2.5.1, 2.6.2.5.2, 2.6.2.5.3, 2.6.4). Several operational and BADCT monitoring parameters must be verified immediately or within 24 hours of an alert level exceedance. The five day time frame for reporting AL or AQL exceedances is reasonable when considering the groundwater seepage velocity (advective transport) in the well field, which is less than 0.09 feet/day under non pumping conditions (i.e., no hydraulic containment). Given this scenario, a contaminant would only travel 0.45 feet in five days. Note that advective transport estimate is based on the hydraulic conductivity (0.57 ft/day); formation porosity (0.08); and pre-ISCR mining gradient (65 feet/mile or 0.012 ft/ft) used to simulate groundwater flow in the Bedrock Oxide Unit (please refer to Exhibit 14-10 of the Permit Application). Additionally, regulations outside the scope of this permit, such as the Emergency Planning and Community Right to Know Act, require notification of releases of hazardous substances to the State and Local Emergency Planning Committee immediately.

64.35. Section 2.6.2.1.l: Paragraph #1, if a surface impoundment freeboard performance level is at risk, why doesn't the Draft APP require that discharges to the impoundment be stopped immediately?

ADEQ response

Exceedance of a freeboard performance level is not an emergency situation and does not warrant immediate cessation of discharge to the pond.

64.36. Section 2.6.2.2: The timeframes for reporting, investigating and repairing a liner breach which becomes evident from an AL #1 exceedance appears excessive? What is the rationale for allowing so much time to pass before investigation and repairs are performed?

ADEQ response

The solution and water impoundments are double lined facilities. The leakage through the upper liner is collected in the leak collection system and removed from between the two liners. This liner system design provides protection of the underlying soils and groundwater by removing the hydraulic head of the pond from driving the water that is between the liners, through the bottom liner of the double lined facility. The AL #1 for each pond was calculated assuming there are four, 2 millimeter holes, per acre of liner. The AL #2 for each pond was calculated assuming there is one, 11.3 millimeter hole, per acre of liner. An AL #1 or AL #2 exceedance is not an emergency situation; it takes time to investigate the location of a potential leak that is due to a very small hole(s) because sometimes the pond must be drained down for inspection. The leak investigation may require lowering the liquid level in the pond to allow visual inspection and testing which can take several days. During the time it takes to investigate the alert level exceedance and repair the liner, the underlying soil and groundwater are protected by the bottom liner. Additionally, Section 2.6.2.2, subparagraph 7, requires a report for ADEQ review, and states that upon review of the report, ADEQ may require that the permittee take additional corrective actions to address the problems identified from the assessment of the liner.

64.37. Section 2.6.2.3: The timeframes for reporting, investigating and repairing a liner breach which becomes evident from an AL#2 exceedance appears excessive? What is the rationale for allowing so much time to pass before investigation and repairs are performed?

ADEQ response

See response to comment 64.36.

64.38. Section 2.6.2.5.2: Paragraph #7 – What, aside from documenting the investigation, is required of the permittee if the sixth sampling event results in an AL exceedance?

ADEQ response

The permittee is required to submit the investigation documentation to ADEQ. Upon review, ADEQ may request additional information, investigation or proposed mitigation measures, or initiate permit amendments. The permittee is required to respond to ADEQ requests.

64.39. Section 2.6.2.5.3: Paragraph #2 – What is the rationale for limiting the projected relationship of the wells in which exceedances were found to the downgradient boundary of the Arizona State Mineral Lease Land? This Draft APP is for a commercial mining project that impacts land well beyond the boundary of the Arizona State Mineral Lease Land. Paragraph #3 – What is the rationale for limiting the notice to downgradient users of the aquifer to only 1.5 miles of the discharge?

ADEQ response

See response to comment 64.16.

The APP rule requires an applicant to identify wells and their uses surrounding the facility out to 0.5 miles. Florence Copper identified the nearest existing drinking water use which is 1.5 miles from the facility.

64.40. Section 2.6.2.6: Paragraph #7 – Within one week of what, shall permittee submit a report to the Groundwater Protection Value Stream? Paragraph #10 – This provisions provides that a leak in a well must be repaired and the mechanical integrity demonstrated to **minimize** the potential for groundwater pollution. [emphasis added]. Any well that has the “potential for groundwater pollution”, when repaired, should be repaired so that it **eliminates** the potential for groundwater pollution. The goal of a repair to a well should not simply be to minimize the potential for groundwater pollution.

ADEQ response

The following phrase has been added to Section 2.6.2.6, Paragraph #7:

“of becoming aware of an alert level exceedance,”

Paragraph #10 states:

“If a leak is detected, operation of the well shall cease until the leak has been repaired and mechanical integrity demonstrated to minimize the potential for groundwater pollution”.

The requirements to repair a leak and demonstrate mechanical integrity are the key parts of this item. Ceasing operation of the well until the leak is repaired will minimize the potential for groundwater pollution. Although the goal is to eliminate to the greatest extent practicable any discharge to groundwater, the APP program does allow for impacts to groundwater within the pollutant management area.

64.41. Section 2.6.2.8: Paragraph #1 – Is the permittee allowed to collect the 3 additional independent conductivity measurements on the same day?

ADEQ response

Paragraph #1 reads in part:

Verify the reading from the annular conductivity device, to confirm there was an AL exceedance. Within 14 days of the AL exceedance, the permittee shall collect 3 additional independent conductivity measurements conducted over a period of 6 days.

This section requires independent samples collected over a 6-day period. ADEQ would not expect that samples would be obtained on the same day, and ADEQ would not consider collection of the 3 additional samples all on the same day to be compliant with the permit. The date and time of sample collection would be included in the report to ADEQ.

64.42. Paragraph #2 – This paragraph states, *if the 3 additional independent conductivity measurements verify an AL exceedance, the permittee shall ...*, does this mean that all 3 additional independent measurements have to verify an AL exceedance, or does it mean if any one of the 3 additional independent measurements verify an AL exceedance then permittee must take the additional steps in subparagraphs a and b?

ADEQ response

If any one of the 3 additional measurements verify an AL exceedance, then the permittee must complete the requirements of this section.

64.43. Paragraph #3 – this paragraph states, *within 30 of verifying the alert level exceedance ...*; within 30 what? Is it days?

ADEQ response

The requirement is for 30 days and has been added to the permit.

64.44. Paragraph #4.d – The required reporting does not make sense, this provision requires permittee to provide, ... *an evaluation of the cause, impacts, and mitigation of any impacts to the LBFU...* It is unclear what is meant by having the permittee evaluate *mitigation of any impacts to the LBFU...* If there are provisions in the Draft APP that require the permittee to implement remedial activities in the LBFU, MFGU, and/or the UBFU, those requirements should either be referenced here or included in this provision.

ADEQ response

If the permittee took actions to mitigate any impact to the LBFU, MFGU or UBFU, then Section 2.6.2.8 paragraph #4.d requires the permittee to evaluate the mitigation actions. Section 2.6.2.8 paragraph #4.e.b requires a plan to correct the condition.

64.45. Paragraph #4.e.b – When is the *plan to correct the condition* due?

ADEQ response

A due date has been added to the permit. The due date is within 90 days of verifying the alert level exceedance.

64.46. Section 2.6.3.5: Paragraph #5 – Correct the typographical error, “... within the in-situ leach are;”

ADEQ response

The error has been corrected.

64.47. Section 2.6.4: Paragraph #1 – As written, this paragraph could be interpreted to mean that the permittee is not required to conduct verification sampling. It current provides that, ...*permittee **may** conduct verification sampling ...* [emphasis added]. And, it also provides that ... *permittee **may** use the results of another sample taken between the date of the last sampling event and the date of receiving the results as verification.* [emphasis added]. Is this the intent that the permittee either conduct verification sampling or it use the results of another sample taken between the date of the last sampling event and the date of the result as verification? If that is the intent, then the Draft APP should state it clearly. Or, if both of these options are discretionary, and the permittee elects not to conduct either, then the permit should state that the unrefuted presumption is that an AQL was exceeded.

ADEQ response

The permittee may conduct verification sampling as described in the comment. If the permittee opts not to conduct verification sampling, then it is presumed that the AQL was exceeded as described in permit Section 2.6.4, paragraph #3 which states:

If verification sampling confirms that the AQL is exceeded for those pollutants that were above their respective AQL(s) or if the permittee opts not to perform verification sampling, then, the permittee shall increase the frequency of monitoring to monthly for those pollutant(s) that exceeded their respective AQLs and shall” [emphasis added]

64.48. Paragraph #3.b – Permittee is required to demonstrate within 90 days ... *that the exceedance was not caused or contributed to by pollutants discharged from the facility*; please clarify the start date for the demonstration – 90 days from when?

ADEQ response

The due date for the demonstration is 90 days after confirming or learning of the violation as described in section 2.6.4 paragraph #3.a.

64.49. Paragraph #5 – The Draft APP should set out the type of notice to be provided to downgradient users who may be directly affected by the discharge, i.e., in writing, hand-delivered, etc. Who determines who the downgradient users are that require the notice?

ADEQ response

Florence Copper is responsible for determining the downgradient users and for determining how to contact them.

64.50. Paragraph #5 – The permit states, ... *submit for ADEQ approval a hydrogeologic investigation work plan within 30 after receiving the laboratory results...*; within 30 what? Is it 30 days? And, 30 days of what start date?

ADEQ response

The requirement is for 30 days after receiving the laboratory results of the third sampling event; this has been added to the permit.

64.51. Section 2.6.5.1: The decision as to whether a discharge *could pose an imminent and substantial endangerment to public health or the environment* is left to FCI; what protocol and/or reporting requirements ensure that ADEQ is notified of such a discharge? If a discharge occurs and FCI determines it does not pose a *substantial endangerment to public health or the environment*, is FCI required to report that decision to ADEQ? Where in the permit is that requirement?

ADEQ response

Permit Section 2.6.5.1 requires the permittee to take immediate action to correct any condition resulting from a discharge that could pose a substantial endangerment to public health or the environment. Permit Sections 2.6.5.2 and 2.6.5.3 cover unauthorized discharges of hazardous and non-hazardous substances, respectively, and require ADEQ notification within 24 hours. Taken together as a whole, these permit sections require ADEQ notification of unauthorized discharges.

64.52. Sections 2.6.5.2 and 2.6.5.3: see comments to Section 2.6.5.1 above.

ADEQ response

See response to comment 64.51

64.53. Section 2.6.5.4: The reporting requirements in Sections 2.6.5.1 – 2.6.5.3, appear to only apply if FCI determines that the discharge endangers the public health or the environment. FCI should be required to report to ADEQ all discharges and for those which FCI determined no endangerment to the public health or the environment, it should provide the basis for that determination.

ADEQ response

See response to comment 64.51.

64.54. Section 2.6.6, subparagraph 5: What is meant by, mitigation to limit the impact of pollutants on existing uses of the aquifer? This Draft APP should be clear that the aquifer underlying the proposed mine is a drinking water aquifer and the quality of that aquifer should be protected.

ADEQ response

Section 2.6.6, subparagraph 5, means that mitigation measures must address the uses of the aquifer at the time of the exceedance. This does not mean that the corrective actions are limited to mitigating existing uses. Pursuant to A.R.S. § 49-224(B), all aquifers are considered drinking water aquifers and ADEQ can require appropriate remedial actions under the permit authority.

64.55. Section 2.7.2: Because this Draft APP allows for the injection of pollutants into the aquifer, the required log book(s) should be maintained for the life of the mine, including closure and post-closure activities.

ADEQ response

The permit requires the log book to be maintained for 10 years from the date of each inspection. This is consistent with APP rule for monitoring record retention (A.A.C. R18-9-A206(B)(3) Monitoring Recordkeeping) which indicates the monitoring records shall be maintained for at least 10 years after the date of the sample or measurement unless the Department specifies a shorter time period in the permit. Additionally, the permit requires pre-operational reports, quarterly reports and annual reports that will document the ISCR Area facilities and operation. The permit requirement for log book retention will remain as drafted.

64.56. Section 2.8: As this section is written, it appears that FCI can maintain the mine in a *temporary cessation* status indefinitely. The Draft APP should require FCI to either bring the facility back into full operation within a certain timeframe, i.e. after three years or proceed to closure.

ADEQ response

The permit does not limit the timeframe for temporary cessation; however, the permittee is required to maintain hydraulic control and perform monitoring required by the permit. The permit requirements are consistent with the rule requirements and ADEQ authority (A.A.C. R18-9-A209) and the permit language is consistent with other similar permits.

64.57. Section 6.6: Subparagraph 2 :-This subparagraph is unclear, must FCI only report the entry of an order or judgment against it and resulting from the operations of the facility subject to this Draft APP; or, must FCI report the entry of an order or judgment entered against it at any other facility controlled or operated by FCI and/or its parent company, Taseko?

ADEQ response

Florence Copper, Inc. is the permittee (permit Section 1.1) and permit conditions only pertain to Florence Copper, Inc.

64.58. Zoning: The Draft APP fails to require compliance with applicable zoning regulations.

ADEQ response

See response to comment 59.18

On behalf of the Town of Florence, we hope that these comments will be considered by ADEQ and accepted in the spirit in which they are offered, one of cooperation and concern. The Town is interested in ensuring that if this Draft APP is issued to FCI, that it be a permit that is as protective of the health and welfare of the citizens, businesses, and visitors of the Town of Florence and that of the environment

October 12, 2020 Town of Florence Letter

64.59. In addition to the Town of Florence's October 9, 2020 comments to the Draft Executive Summary and the Draft Aquifer Protection Permit (APP) No. F'-101704, Place ID 1579, LTF 76820, Significant Amendment for the Florence Copper Project, the Town has reviewed those comments filed on this date by Ronnie Hawks on behalf of SWVP GTIS MR, LLC ("SWVP"), The Town endorses SWVP's comments and adopts same as though fully incorporated herein

As with the Town's October 9, 2020 comments, the Town hopes that ADEQ will give the SWVP's comments due consideration, will fully comply with the law, and will revise the Draft APP accordingly to ensure that if the APP is issued to FCI, that the permit is as protective to human health, welfare, and safety and to the environment.

ADEQ response

Comment noted.

#65, Dennis and Barbara Manning: The commenter submitted the letters date August 14, 2020 and September 23, 2020. ADEQ has added numbering to the comments (1 through 13).

August 14, 2020 Manning Letter

65.1. This letter concerns the public comment deadline of September 11, 2020 for the permit which will allow Florence Copper to proceed with its commercial in-situ mining operation. Considering the potential environmental impact and the technical nature of the permit a 30 day review and comment period is inadequate. The experience with the pilot test permit is an example of the necessity of adequate review. The initial permit issued to Florence Copper was described as faulty by an administrative law judge and sent back for amendments. In order for a thorough review and community input the Town of Florence has requested a 90 day extension. Since Florence Copper requires additional permits to proceed with its commercial operation this 90 day extension will not adversely affect them financially. We urge you to extend the review and public comment by 90 days as requested by the Town of Florence.

ADEQ response

See response to comment 64.1.

September 23, 2020 Manning Letter

This letter contains our comments and questions pertaining to an Aquifer Protection Permit for Florence Copper.

65.2. The Town of Florence and some residents, as myself, requested a delay of the public hearing to allow additional time for other expert hydrologists to review the details of the permit and to make suggestions/comments. Their request was denied. Please explain the rationale for the decision.

ADEQ response

See response to comment 64.1.

65.3. The purpose of the 2 year production test facility on state land was to collect and evaluate data as to the safety of the in-situ mining process. Though the 2 year production test has not been completed ADEQ is allowing Florence Copper to apply for a commercial permit. Why?

65.4. Even though data from the production test has not been published, data which allow the public to evaluate the safety of a commercial project, ADEQ has allowed Florence Copper to move forward to obtain a commercial permit with a premature hearing. Why?

65.5. The data should have reported if Florence Copper had maintained hydraulic control of the sulfuric acid solution. Did Florence Copper lose hydraulic control of the sulfuric acid solution? How many times was control lost? Did Florence Copper report loss in a timely manner?

65.6. The data should also contain information about the rinsing process, restoring the groundwater back to pre-mining conditions. Has Florence Copper been able to restore ground water to pre-mining conditions? If not, how long does the company have to accomplish this requirement? Is ADEQ going to issue a commercial permit before FCI returns ground water to its pre-mining condition?

ADEQ response

For comments 65.3, 65.4, 65.5 and 65.6, see response to comment 59.6.

65.7. We did see a 2019 FCI pond water sample analysis which showed that Calcium, Radium and Uranium did exceed AWQS. What was ADEQ's response to these exceedances? What did FCI do to meet AWQS?

Was a 2020 pond water analysis done and what were the results?

ADEQ response

The PTF permit required characterization sampling and analysis for the contents of the PLS Tank, Raffinate Tank, Process Water Impoundment, and Run-off Pond. The purpose of the sampling was to characterize the liquid in these facilities, and the permit did not set alert levels or discharge limits. Because the design of the facilities prevents pollutants from reaching the aquifer, the comparison to AWQS is not required by the permit and there are no exceedances or contingency actions required. The permit does not require periodic sampling and analysis for discharge characterization.

65.8. All of the above questions should have been answered before allowing FCI to request a commercial permit and before any hearing. This premature hearing was to evaluate the permit. Few, if any speakers commented on the contents of the permit. The hearing became a forum on jobs, possible economic stimulus for the area and a platform for candidates running for Mayor and/or Town Council to campaign.

ADEQ response

Florence Copper submitted an application and ADEQ reviewed the application to determine whether it met APP requirements as required by statute and rule (A.R.S. 49-243.B.1 and A.A.C R18-9-A201(G)). ADEQ provided for public comment during the public hearing and recorded all comments regardless of the topic per A.A.C. R18-9-109.

65.9. Though we were told that best available demonstrated control technology was used to develop the aquifer protection permit, that statement does not alleviate our concerns regarding the protection of the aquifer from the effects of the in-situ mining process. That same best available demonstrated control technology was used to develop the permit for the pilot test project. That permit was found so faulty by an administrative law judge that both ADEQ and the mining company had to go back and provide additional safeguards to protect the aquifer. It was the diligence of outside experts who discovered the deficiencies in the permit which resulted in a permit with more safeguards.

ADEQ response

Comment noted. ADEQ modified the permit requirements as directed, and the permit was upheld on appeal.

65.10. According to your APP guidelines-BADCT, a person applying for the APP must be financially capable of constructing, operating closing and assuring proper post-closure care of the facility. Florence Copper does not have the 22 million dollars required at this time and must raise this money. Is ADEQ going to ignore this requirement and issue the permit prematurely?

ADEQ response

See response to comments 59.14 and 59.15.

65.11. Though I am still hopeful that additional experts will comment or offer suggestions on the permit before the deadline, even a lay person can note some deficiencies in the permit. Even though the entire commercial project lies within the flood plain of the Gila River the permit does not require any monitoring of the Gila River. Why has this been omitted?

The permit should provide more protection for the aquifer and the Gila River.

ADEQ response

See response to comment 59.7.

65.12. The draft permit should require reporting exceedances immediately rather than a 5 day delay. Allowing Florence Copper 60 days to provide a corrective action plan if releases occur which can contaminate the soil, groundwater, aquifer or Gila River is unacceptable.

ADEQ response

See response to comment 59.12.

65.13. The mission statement of ADEQ is "to protect and enhance public health and the environment." In order to accomplish ADEQ's mission statement the Groundwater Section has to insure that the Aquifer Protection Permit issued to FCI protects the drinking water of thousands of residents in Florence and protects the Gila River. This is a difficult challenge because a report issued by the state geology department warns that in-situ mines should be kept away from aquifers and the FCI mine is adjacent to the aquifer which provides that drinking water. In addition EPA has already issued an Aquifer Exemption to FCI. Yes, Florence Copper is permitted to pollute the aquifer to a certain degree. The Groundwater Section must review all data from the test production and issue a permit with sufficient safeguards and monitoring to prevent any pollution of the drinking water. This is a big responsibility and should not be rushed.

ADEQ response

Comment noted. See response to comment 59.6.

#66, Armand Young: The commenter submitted the following letter on August 16, 2020.

66.1. Request the Draft Aquifer Protection Permit be extended for 90 days longer. People in our community are either on vacation or are winter visitors, own property, and cannot participate in the process until January 2021. Why does ADEQ schedule at times when most people are not able to attend.

ADEQ response

See response to comment 64.1. Interested parties were given the opportunity to attend the hearing virtually, regardless of their location, and all interested parties were able to submit written comments regarding the permit.

66.2. I object to the amendment to the Aquifer Protection Permit for the Florence Copper Project Production Test Facility. It appears that ADEQ is trying to force this test facility on the Town of Florence. We do not need any speculative mining company doing tests on our water supplies. This same permit was overturned after a judge found the permit to be arbitrary, unreasonable and unlawful. You guys think you can change a court's ruling through this action. See you in court.

ADEQ response

The permit for the test facility was revised and re-issued on August 3, 2016; the revised permit was upheld upon appeal. The subject of this public comment period is the commercial permit for the mine to allow expanded operation based on the data obtained through operation of the test facility. ADEQ does not take a position on the location of a particular facility, only whether it meets the requirements for a permit. ADEQ is required by statute and rule to issue a permit for a facility that meets APP requirements.

66.3. There is no shortage of copper. At 2.10 per pound Taseko's only objective is to set up this test in their favor to try and convince ADEQ that their same old technology is safe. We know that it is not safe. Take a look at the Pinal Creek/Miami Wash contamination. BHP has spent 170 million to clean the water without any success. Is that what you

want for Florence? Taseko is not even worth 170 million. Your agency needs to protect our water and land not create environmental disasters.

ADEQ response

See responses to comments 59.6, 59.14 and 59.15.

Most of the residents at Anthem are on vacation or at their summer homes. This meeting needs to happen when the residents are here.

ADEQ response

See response to comment 64.1. Interested parties were given the opportunity to attend the hearing virtually, regardless of their location, and all interested parties were able to submit written comments regarding the permit.

#67, Kyle Varvel, United States Department of the Interior, Bureau of Indian Affairs, San Carlos Irrigation Project: The commenter submitted the following letter on October 12, 2020.

BIA, San Carlos Irrigation Project's (SCIP) analysis of the proposed action has determined that there will be impacts to the LBFU and top of bedrock aquifer units that the BIA SCIP irrigation wells #9 and #10B are located in. BIA SCIP submits the following comments/concerns:

67.1. Impacts to BIA Wells: The APP and UIC requirements that the BIA wells #9 and #10B will need to be plugged and abandoned prior to ISCR operations, but they do not address the need for Florence Copper (FC) to replace them in a new location outside the exclusion zone with well(s) of a similar capacity and water quality. According to the APP, "All boreholes or wells, other than those approved for the resource block, located within 500-feet of the well field boundary will be plugged and abandoned per the Arizona Department of Water Resources (ADWR) rules and EPA Underground Injection Control (UIC) regulations prior to resource block operation." BIA wells #9 and #10B are immediately adjacent to the mineral lease and will be impacted by this 500-ft setback. Under such UIC class III permit restrictions, since these wells are required to be abandoned then it should be the responsibility of FC to pay for both abandonment and relocation of the irrigation wells with similar capacity outside the 500-foot well field boundary setback including conveyance of the water back to the SCIP canal.

ADEQ response

The APP permit requires Florence Copper to abandon the wells within 500-feet of the wellfield in order to protect water quality. ADEQ does not have the authority to require that Florence Copper provide replacement wells.

67.2. The contaminant transport model suggests that the LBFU adjacent to the ISCR mining operations will have sulfate concentrations significantly above the EPA secondary MCL and AWQS of 250 mg/l with limits at the perimeter wells of 750mg/l. Given this and the need to plug and abandon the BIA wells #9 & #10B and redrill them someplace else, it is recommended that alternate well locations be at least a 1,000-foot setback from the ISCR mining areas and generally in an upgradient direction to the southeast or east.

ADEQ response

See response to comment 68.54.

67.3. Water Quality Monitoring: If pregnant leachate solution was to accidentally leak down from the Solvent Extraction/Electrowinning process ponds the low pH water entering the UBFU would be highly concentrated with several heavy metals (e.g., copper, arsenic, cadmium, aluminum, etc.) and with radionuclides. If this water is pulled up in nearby irrigation wells for SCIP water supplementation purposes, then it could potentially lead to metals build up in the plants to the point of plant toxicity (i.e., often associated with stunted plant growth) or to the point of toxicity for consumption of the vegetables grown. The BIA wells should be tested for water quality preferably on an annual basis. At the minimum, there should be a baseline water quality established and then periodic monitoring of pH and electrical conductivity can be quickly completed with a handheld probe to verify the water is within normal physical parameters.

ADEQ response

The process ponds are designed with double liners and leak collection systems that will be monitored for signs of leakage, and contingency actions taken in the event a leak is detected. Point of compliance (POC) wells M32-UBF (replacement) and M33-UBF (replacement), are located downgradient (northwest) of the water impoundments and process ponds, respectively, and will monitor the Upper Basin Fill Unit for pollutants that would indicate an impact from the ponds (permit Tables 13 and 14). ADEQ believes the leak

collection system and groundwater monitoring is adequate to protect downgradient water quality, and that the permit should not include monitoring of the BIA wells. Additionally, see response to comment 64.36.

67.4. HDPE Liner: Most HDPE lined impoundments containing potentially hazardous solutions are often composite lined by placing a low permeability clay (i.e., hydraulic conductivity equal to or less than 5×10^{-6} cm/s or 0.01417 ft/d). In this manner, if there is a tear in the liner causing a leak, the flux through the liner will be limited to the hydraulic conductivity of the clay beneath. The APP only specifies “compacted subgrade” beneath the liner for the ponds and not a compacted clay liner subgrade. Why is a low permeability clay lining not being considered instead of the “compacted subgrade”?

ADEQ response

The ADEQ approved liner specifications include a requirement that the subgrade meet a hydraulic conductivity no greater than 1×10^{-6} cm/s, which is only achievable using soil with sufficient clay content (Design Specifications Sections, Copper Extraction Facility, Florence Copper Project, Florence Copper Inc., by Haley and Aldrich, Inc., November 2019, Section 31 23 00 – Earthwork, 2.03 Liner Subgrade Fill. Item E).

67.5 Another concern is that the process water ponds do not appear to require routine monitoring well samples from the UBFU and the APP only suggests that a “ONE-TIME SAMPLING EVENT - DISCHARGE MONITORING LOCATIONS” will occur for each process water pond prior to discharge into the ponds. Nothing was noted for routine sampling requirements of monitoring wells adjacent to the process ponds.

ADEQ response

See response to comments 67.32 and 64.28.

67.6. While the calibrated Magma model had claimed an average extraction of 109% of injected solutions, review of the model files showed some areas where the extraction was 125% and 135% of injected solutions. While it is unknown if either model was updated in the interim period, it is concerning that the APP is requiring extraction volumes equal to only 106% of injected lixiviant and not the 109% the model was calibrated too.

ADEQ response

Note that the Magma model described in the comment is no longer valid. Advances in groundwater modeling software, modeling techniques, and changing groundwater conditions at the Florence Copper well field have necessitated the development of the current site model as a replacement of the Brawn and Caldwell model that was developed in 1996. Florence Copper prepared and developed a MODFLOW based groundwater flow model to simulate the current flow conditions at the Florence Copper site. This groundwater model was originally created by Brown and Caldwell (2012) and was subsequently updated in 2019. The current model incorporates pumping and water level data from 2010 through 2017, hydraulic parameters for the Bedrock Oxide Unit developed from pump tests, and geophysical logging conducted at the PTF well field.

Note that the minimum 106% net extraction rate is sufficient for maintaining the inward hydraulic gradient and subsequent capture of mining solutions. This is demonstrated by the PTF operations and Quarterly Monitoring Reports that have shown that the BADCT requirements for hydraulic capture have been maintained since PTF operations began in December 2018 (Please refer to Response 68.6).

67.7. A discussion should be provided on how simulations of leach solution containment demonstrated in the 1996 Magma Model are applicable to the current Curis modeling study.

ADEQ response

Please refer to Response 67.6.

67.8. An illustration should be provided to document projected groundwater levels at the end of mining operations for purposes of depicting the hydraulic sink around the leach area.

ADEQ response

Florence Copper was not required to provide an illustration as suggested by the comment. The permit requires that hydraulic control be maintained throughout operations and closure rinsing. Once rinsing is complete, all but a few wells reserved for post-closure verification, must be abandoned. .

67.9. The Town of Florence (TOF) should request that Curis provide additional information regarding the model to confirm that it can be used as a decision-making tool to evaluate groundwater quality protection measures associated with proposed mining operations.

ADEQ response

Comment noted. Please see Comments from the Town of Florence, 64.1 through 64.59.

#68, Ronnie P. Hawks on behalf of SWVP-GTIS MR, LLC (“SWVP”): The commenter submitted the following letter on October 12, 2020.

General Comments

68.1. The applicant did not demonstrate that the facility complies with applicable zoning ordinances and regulations, as required by A.R.S. §49-243(0).

ADEQ response

See response to comment 59.18.

68.2. ADEQ has previously taken the position that no permit or permit amendment for commercial operations would be issued until operation of the Pilot Test Facility (PTF) had been completed, groundwater had been restored, and the applicant had demonstrated that it could conduct In Situ Copper Recovery (ISCR) operations safely and without harm to the groundwater drinking aquifer. In addition, the applicant stated that the purpose of the PTF was to gather the data needed to demonstrate that it could conduct the ISCR operations safely, without risk to public health, safety, or the environment. The applicant filed its application for commercial operations just 6 months into operation of the PTF. The application referenced and/or incorporated little or no data from PTF operations. Restoration activities began only in or around June 2020 and the applicant has not demonstrated that it can restore the aquifer to permit standards. Therefore, the prerequisites for issuing this permit have not been met.

ADEQ response

See response to comment 59.6.

68.3. Given that PTF injection and recovery operations have ceased, the applicant should be required to verify the accuracy of its groundwater and geochemical models with data from PTF operations along with any other elements of commercial operations and permitting to which PTF data is relevant. The results should be submitted for review before a decision on this permit is made.

ADEQ response

Per Section 2.7.4.1.1, groundwater modeling updates will be conducted annually. The modeling updates will incorporate new hydraulic information acquired from aquifer tests and subsequent model re-calibration, if necessary. Additional verification of the geochemical modeling will be included in the PTF Well Field Rinsing Demonstration Report (Permit Section 2.7.4.5.), where post-rinsing resource block concentrations will be compared to previous geochemical modeling results.

68.4. The permit is supported by groundwater modeling and other data provided by the applicant in support of the applicant's position that the aquifer behaves as equivalent porous media and is uniformly homogenous in its characteristics. But available data from PTF operations demonstrates extensive heterogeneity in the aquifer properties of the ore body, in marked contrast to the homogeneity that is assumed by the applicant and that is essential to efficient mining, hydraulic control, and environmental protections under the applicant's plan of operations.

ADEQ response

The ISCR operation is entirely dependent on equivalent porous medium (EPM), which is based on the concept that groundwater flow in fractured media behaves similarly to groundwater flow within porous media, such as alluvium and porous sandstone. The concept is demonstrated by groundwater movement through interconnected fractures within the ore body. ADEQ understands that groundwater flow within geologic strata with relatively few fractures will respond differently to hydraulic stresses than strata that is highly fractured. For example, if the ore body had a low density of fractures that had little or no interconnectivity, then the aquifer tests would show erratic hydraulic responses such as little or no recovery in the pumped well or Observation wells. Slow or minimal recovery in the test wells would be indicative of low storativity (i.e., lack of hydraulic connection) throughout the formation being tested. This would be a reflection of large geologic heterogeneities and extreme anisotropy within the saturated ore body. These conditions are not apparent within the proposed ISCR well field.

EPM at Florence can be further explained by the nature of fracturing within the ore body. As cited in the Florence Copper application (Exhibit 15-7), Hsieh and Neuman (1985) and Hsieh and others (1985) demonstrated EPM in the fractured granites near Oracle, AZ through hydraulic testing. Also notable is the the fractured spacing of 16 inches observed in boreholes in the granitic rock near Oracle (Jones et al., 1985). This is relevant because the mean fracture spacing within the Bedrock Oxide Unit at Florence is approximately 1.5 inches as demonstrated by Applied Research Associates, Inc. (1995 [Exhibit 14-6 of the application]). This fracture spacing is an order of magnitude less than what was observed in the granite in Oracle, which translates to a higher fracture density within the Bedrock Oxide Unit. Also notable is that 80% of cores sampled at Florence (74,233 sample intervals in 357 drill holes) showed open fracture spacing of less than 2 inches (refer to Table 1.1, Figure 1.1, Exhibit 14-7: Evaluation of Conceptual Models for Flow In Fractured Rocks, Dr. Shlomo Orr, 1997). Neumann (1987) demonstrated that the average number of fractures required within a given volume of formation or test zone is ten for the formation to behave as an EPM.

The EPM concept was also used in the groundwater modeling simulation of the ore body, with noted heterogeneity variations unique to the Florence Copper site such as preferential flow through fault zones transecting through the site (please refer to Exhibit 10-4 of the Permit Application). The groundwater model was based on Darcian flow and was calibrated to observed site conditions further demonstrating the EPM concept. Note that EPA concurs with ADEQ's interpretation of the groundwater flow regime acting as EPM at the proposed ISCR well field per EPA's November 15, 2019 Letter to Ronnie P. Hawks regarding the "Response to Letter dated September 5, 2019 regarding the Class III Underground Injection Control Area Permit No. R9UIC-AZ3-FY11-1 for the Florence Copper, Inc. Production Test Facility".

The EPM concept at Florence is further demonstrated by the hydraulic well tests performed in the proposed well fields at Florence (Exhibit 14-3). Florence Copper conducted multi-well hydraulic (pump) tests from four recovery wells (R-01, R-03, R-05, and R-07). The pumping rates at each of the pumping wells were similar (approximately 40 gpm). Several Observation wells (M54-LBF, M54-O, M55-UBF, M56-LBF, M57-O, M58-O, M59-O, M60-O, M61-LBF, MW-01-LBF, and MW-01-O) were used to measure hydraulic head responses at various distances (up to 427 feet). In general, the well testing showed hydraulic influence or connection throughout the Bedrock Oxide Zone as indicated by the measured responses from the Observation wells as far away as 400 feet from a pumping recovery well. Relevant findings from the PTF well tests include the following:

- *Measured transmissivity (T) values derived from the recovery wells ranged from 331 to 615 ft²/day;*
- *The estimated average hydraulic conductivity (K) derived from the well tests is 0.54 ft/day, which is consistent with the K value (0.57 ft/day) used for the Bedrock Oxide layers in the numerical flow model for the site;*
- *Measured K values derived from the recovery wells ranged from 0.4 to 0.8 ft/day indicate minimal permeability heterogeneities within the PTF well field.*
- *The spatial drawdown patterns at the pumping wells and comparable hydraulic responses at the Observation wells at similar distances indicate minimal horizontal anisotropy.*
- *The hydraulic responses can be simulated using the analytical solution based on Darcy's Law, which validates the EPM assumption for the tested aquifer.*
- *The aquifer tests show sufficient hydraulic connection between the recovery wells and Observation wells demonstrates that the cone of depression from the planned pumping rates are adequate to maintain hydraulic control.*

The continuous operation of the PTF since December 2018 further supports the EPM concept. The PTF operation relies on hydraulic control of the ISCR solutions to meet the BADCT requirements specified in the permit. Hydraulic control is demonstrated through monitoring of Observation wells, Operational wells, Supplemental wells, and POC wells, and Injection/Recovery wells. The PTF Quarterly Monitoring Reports demonstrated that hydraulic control of the PTF was maintained throughout the PTF operations. Overall, hydraulic capture of the lixiviant solution was ensured by maintaining the cone of depression within the aerial

extent of the PMA. Maintaining hydraulic capture would not be possible if the EPM assumption was not valid.

68.5. In an injection-recovery test conducted in August 2018, water levels in the PTF injection wells varied from 1,616 feet at I-02 to 1,314 feet in I-01. Rather than responding to injection uniformly, as the applicant's model would predict, the actual response to injection varied by more than 300 feet within a short distance. There appear to be no subsequent submittals that reveal injection water levels, but no doubt these show similar extreme heterogeneity.

ADEQ response

The injection-recovery test was performed to demonstrate hydraulic containment in order to meet the pre-operation conditions under Section 2.7.4.3 of the APP and Part II of the USEPA UIC Permit. The pressure buildup at I-02 was likely a reflection of residual polymer based mud in the borehole surrounding the well rather than extreme formation heterogeneities. It should be noted that the overall objective of the pre-operational testing was achieved by demonstrating hydraulic capture at the given the injection/recovery rates. It's noteworthy that the required BADCT monitoring after the required injection tests did not indicate mounding within the PTF well field as demonstrated in the 4th Quarter 2018 Monitoring Reporting.

68.6. The permit requires the applicant to maintain an inward gradient to the mine that extends outward at least 500 feet, with the expectation that the gradient around the mine will extend out many miles (per the applicant's groundwater model). But this same mandate has been often violated during PTF operations, with instances where the inward gradient barely extended beyond the mine itself. Ore body heterogeneity is confirmed on many of the water table contour maps and is likely evident in other data not available to the public. Maps submitted by the applicant to EPA demonstrate non-compliance. Nothing has been found in the application materials or permit to explain these problems, to address them with revised operational plans, additional monitoring or contingency actions, or to enhance enforcement when the requirement is not met.

ADEQ response

Based on the bullet points below, ADEQ does not agree that the potentiometric maps demonstrate non-compliance with permit conditions. Please refer to response 68.4 regarding Florence Copper's demonstration of EPM. Florence Copper has also demonstrated hydraulic containment of lixiviant solutions by meeting the permit BADCT requirements as follows:

- Inward hydraulic gradients were measured routinely between Recovery and Observation wells. This information was presented in graphical and tabular formats. The hydraulic gradient has been maintained with a greater than 1-foot differential as a daily average throughout each quarterly monitoring period. It should be noted that a small percentage of daily measurements (less than 5%) were not obtained at different well pairs due to routine well maintenance and scheduled mechanical integrity testing. Despite the missing data, the information provided along with the other BADCT monitoring adequately demonstrates hydraulic control. Inward hydraulic gradients have been maintained throughout each of the quarterly monitoring periods at the PTF.*
- The monthly minimum, average and maximum potentiometric maps of groundwater elevations in the bedrock oxide unit, as provided in the quarterly reports, consistently show hydraulic capture throughout the reporting period. The potentiometric surface maps demonstrate inward flow toward the recovery wells throughout each of the quarterly monitoring periods.*

68.7. The permit is supported by groundwater modeling and other data provided by the applicant in support of the applicant's position that the aquifer behaves as equivalent porous media and is uniformly homogenous in its characteristics. But available data from PTF operations demonstrates extensive heterogeneity in the aquifer properties of the ore body, in marked contrast to the homogeneity that is assumed by the applicant and that is essential to efficient mining, hydraulic control, and environmental protections under the applicant's plan of operations. In an equivalent porous medium with a uniform porosity, the effects from an aquifer test should produce a smooth cone of depression in which drawdowns decrease steadily with distance from the pumping well. In contrast, the aquifer test for PTF well MW-01 showed drawdown to be essentially the same at various distances from the pumping well, which means that aquifer heterogeneity causes the distribution of pumping effects to vary by location, with fractures causing drawdowns at distance to be as large as drawdowns closer to the well.

ADEQ response

Please refer to responses 68.4 and 68.5. The question regarding the aquifer testing at MW-01 is not clear.

The Formation Testing Report in Exhibit 14-3 provides observed drawdowns at MW-01-O during several pump tests within the PTF well field. The well hydrographs in Appendix A illustrate the well responses at MW-01-O during pumping at Recovery Wells R-01, R-05, and R-07 (distance from the pumping well provided): R-01 (71 ft), R-05 (427 ft), and R-07 (244 ft). The well hydrograph at this well shows similar responses at various differences but the magnitude of drawdowns are slightly different, ranging from 6 feet during the R-01 test to 4.5 feet during R-07 test. The hydraulic response at MW-01-O clearly demonstrates that the radius of influence can extend 427 feet during pumping (R-05). Furthermore, the drawdown responses and range of measured K values (0.4 and 0.8 ft/day) indicate that there is no strong horizontal aquifer anisotropy.

68.8. On page 3 of Attachment 3 of the applicant's Fourth Quarter 2019 PTF monitoring report, Recovery Well R-06 experienced a 52-foot rise in water levels over four days (December 3-7, 2019), while at nearby R-05 there was a small decline. This demonstrates significant aquifer heterogeneity. In the same report, aquifer heterogeneity also is shown by depth-profile results from pumping of Recovery Well R-01. There was essentially no inflow to R-01 over a 140-foot section of the well (depths 720-860ft). Half the inflow to R-01 was below this section and half was above (and in the latter, very little between 550-660 feet). Such evidence undermines the reliability of a core assumption underlying this permit that the aquifer behaves like an equivalent porous medium.

ADEQ response

ADEQ does not agree with the commenter's assertion regarding that the EPM assumption is invalid. Note that Attachment 3 of the Fourth Quarter 2019 PTF monitoring report provides a series of potentiometric surface maps of the PTF Well Field. It appears that the question is referring to Attachment 4 of the Fourth Quarter PTF Monitoring Report.

Attachment 2 provides the daily water levels in the I/R Wells in Table 1. As shown in Table 1, the variation in water levels is most likely due to stresses applied to the PTF well field during the first 10 days of December 2019. It's noteworthy that R-05 also showed a shift in water levels from 1174.56 ' to 1208.17' between December 9th and 10th.

The changes in water levels reflect the changes in injection and recovery rates in the well field during this time rather than extreme heterogeneities in the ore body. Table 1 and Figure 3 show that the combined well field injection rate decreased from 346, 100 gpd to 216,300 gpd between December 1st through December 10th. The combined well field recovery rates also decreased from 387,700 to 240, 000 gpd during the same time period. The reduction in I/R rates did affect hydraulic containment as the BADCT requirement for 110% recovery was maintained throughout Q4 2019.

68.9. No-flow stagnation zones in the ore body demonstrate that at least some portions of the Oxide Zone have limited porosity and/or permeability. For example, an ADEQ e-mail dated April 17, 2017 asks about monitoring of the 'demonstrated stagnation zones' and notes the role of discrete fractures in creating selective pathways. This is consistent with data from the BHP tests in the 1990s, which also show an aquifer with a strong influence on flow from fractures and impermeable zones. Such evidence undermines the reliability of a core assumption underlying this permit that the aquifer behaves like an equivalent porous medium.

ADEQ response

The EPM concept at the Florence Copper site was first demonstrated through hydraulic well testing conducted by Golder (1996; Exhibit 14-2). Golder concluded that the Bedrock Oxide Unit supported Darcian flow and responded to hydraulic stresses as an EPM. This conclusion was supported by the Formation Testing Report in Exhibit 14-3 that postdates the April 17, 2017 ADEQ email and the Quarterly PTF Monitoring Reports (please refer to response 68.4). The EPM concept will be verified by aquifer testing prior to each resource block expansion as required as a pre-operational condition in Section 2.7.4.3 in the APP.

68.10. Tracer tests in June 2018 revealed marked differences in travel times between injection wells and Westbay wells, with first arrivals spread out over 3 days, the depth of first arrivals varying from zone 1 to zone 5, and the dye concentrations varying over two orders of magnitude. Such evidence undermines the reliability of a core assumption underlying this permit that the aquifer behaves like an equivalent porous medium.

ADEQ response

The well field tracer tests provided in Exhibit 14-3 do not indicate extreme heterogeneities in permeability that would invalidate EPM.. The tracer breakthrough occurred within the anticipated 14- day timeframe, which were based on the transport parameters used in the groundwater flow model. Note that the tracer tests were injected only in the middle screened interval (675' to 890' bgs) in each Injection well; therefore, it would be expected that tracer arrival times and dye concentrations would vary across different zones in the Westbay Wells. Overall, the test results confirmed that the well field design adequately controlled the circulation of injected fluid within the well field, which validates the EPM concept.

68.11. Acid injection and recovery at the PTF mine provides the ultimate aquifer test of the ore body. Any groundwater model submitted in support of this permit must replicate actual PTF performance throughout its lifetime. The permit is supported by groundwater modeling that assumes ore body homogeneity. The groundwater model is not well calibrated to PTF results and couldn't be given the application was submitted only 6 months into PTF operations. The model will never be properly calibrated given its underlying assumption of ore body homogeneity. The model does not replicate actual PTF performance and cannot be relied upon in support of this permit.

ADEQ response

Florence Copper has prepared and developed a MODFLOW based groundwater flow model to simulate the current flow conditions at the Florence Copper site. This groundwater model was originally created by Brown and Caldwell (2012) and was subsequently updated in 2019. The current model incorporates pumping and water level data from 2010 through 2017, hydraulic parameters for the Bedrock Oxide Unit developed from pump tests, and geophysical logging conducted at the PTF well field. Note that the model will be updated annually with any newly acquired hydraulic data obtained from pre-operational aquifer tests per the requirements in Permit Section 2.7.4.1.1. Please refer to responses 68.3 and 68.4 regarding EPM.

68.12. The applicant should be required to demonstrate that its geochemical model and the projected contaminant concentrations of various flow streams that are based on that model reasonably match actual contaminant levels in process flow, groundwater, and impoundment water. The demonstration should be substantially similar to what ADEQ requested in its September 7, 2011 deficiency letter to the applicant, "Pursuant to A.A.C. R18-9-A202(A)(11), the Significant Amendment Application shall compare the actual chemical concentrations (including any AWQS exceedances) for the mine block wells and POCs (prior to and after the 1997 pilot test/rinsing), as compared to the Estimated Composition of the Florence ISCR Process Solutions Forecast Groundwater Quality After Block Rinsing (Table 3.1-Tab 10A) constituents as projected by the groundwater modeling. This shall also include a comparison of the gross alpha groundwater concentrations, as well as a discussion of any major differences between actual groundwater concentrations at the former mine block wells and POCs, relative to the concentrations projected by groundwater modeling in Table 3.1. The nitrate values for the Forecast Groundwater Quality after Block Rinsing (column 8) shall be explained. Additionally, the Application shall explain if the Forecast Composition of Pre-Stacked PLS (column 3 in Table 3.1) is the proposed concentrations of solutions that will be reinjected/ re-circulated back into the subsurface until certain soluble copper concentrations are achieved."

ADEQ response

The geochemical modeling results in Exhibit 10-1 post-dates the ADEQ deficiency letter. Note that geochemical modeling predicts the chemical composition of process solutions and final groundwater chemistry after rinsing ADEQ will compare these results to groundwater monitoring data obtained within each resource block after rinsing.. The geochemical model represents an update of earlier pre-1997 geochemistry models prepared by BHP Copper and Schlumberger Water Services, based on data and information acquired after BHP Pilot Test. Sampling and analysis of the process streams including the PLS and Raffinate Ponds will be sampled in accordance with Section 2.5.1 of the APP. ADEQ will compare these results to verify the geochemical modeling results. In addition, as specified in Section 2.9.1.1 of the APP, confirmation monitoring of groundwater from mined resource blocks will be sampled for the Table 14 parameters (including radiochemicals) in Section 4.2. The results will be compared to AWQS to measure the effectiveness of formation rinsing. Samples from rinse verification wells shall be at one month, six months and one year increments after groundwater rinsing has ceased. Per permit Section 2.7.4.5, analysis of the geochemical conditions will include geochemical modeling of the long-term equilibrium of the residual solid phase mineral constituents. The report shall be signed and sealed by an Arizona registered professional.

68.13. The permit is premised in part on a geochemical model that was greatly simplified from earlier iterations, raising significant questions about the completeness and accuracy of the model. No explanation has been found for

why categories of information found in past model summaries are missing from the application for this permit. The applicant did not confirm the geochemical model by comparison to data from PTF mining. The model cannot be relied upon while ignoring such real-world data.

ADEQ response

ADEQ finds the information used to develop the model forecasts to be complete and representative of the site conditions at Florence Copper. The model will be verified through actual data of the well field after rinsing (please refer to response 68.12).

68.14. It is not clear whether the applicant re-injected raffinate after reacidification during PTF mining. If so, the applicant should compare real-world data and impacts on the aquifer to the groundwater and geochemical models and forecasts relied upon for this permit.

ADEQ response

As described in Permit Section 2.1, the barren solution (raffinate) from the SX/EW plant will be re-acidified and re-injected back into the oxide zone. Please refer to response 68.12 regarding verification of the geochemical model.

68.15. Rehabilitation of wells was required during the short term of PTF operations. No discussion of the probability and frequency of well rehabilitation, maintenance, repair or replacement was found in the application materials. Similarly, no discussion was found of methods proposed for addressing precipitates and debris that may form in wells as a result of ISCR operations. These issues should be addressed as part of permit review and the permit should include basic requirements for determining whether mine block wells are performing as designed.

ADEQ response

Well maintenance and/or rehabilitation is addressed under the Florence Copper EPA UIC Permit No. R9UIC-AZ3-FY11-1. Florence Copper. Under the permit requirements, Florence Copper must follow specific guidelines for addressing well performance issues such mineral deposition of CaSO_4 . Proposed well rehabilitation or maintenance must meet the following permit requirements:

- *Part II.E.4.A. Injection Pressure Limitation. Injection wells shall be operated at pressures less than the fracturing pressure of the Oxide Bedrock Zone. Based on field test data at the PTF site, a fracture gradient of 0.65 psi/foot (ft) of depth must not be exceeded.*
- *Part II.E.6. f. Injectate Fluid Limitations. The permittee is required to submit a report for the Director's approval that includes the name and grade of each process chemical that is proposed to be used at the PTF.*

68.16. The applicant's groundwater model did not incorporate at least 2 known production wells that were active on the applicant's property during PTF operations - BIA-10 and BIA-9R. Pumping data for BIA-10 for 2018 and 2019 are provided with these comments. Pumping data for BIA-9R is not available as this is a well constructed, owned and operated by the applicant. The groundwater model cannot be relied upon in support of the permit absent incorporation of these active on-site wells.

ADEQ response

BIA-10 and BIA-9R were not included in the modeling because these two wells will be abandoned in accordance with Section 2.2.3 of the APP, which requires that all boreholes and wells within 500 feet of the ISCR Area. The predictive reliability of the groundwater model will not be affected as these wells will not be in operation during the proposed ISCR expansion (please refer to Response 68.39). Note that any changes in hydrologic conditions within the will be addressed in the annual modeling updates (please refer to Response 68.3).

68.17. Two irrigation production wells, BIA-10 and BIA-9, are located within the area to be mined during production years 1 and 2 and are also within the Discharge Impact Area (DIA). The applicant had previously promised that those wells would be abandoned, but was not required to do so under previous permits. The wells remain open and at least one continues to be used. The permit should expressly require the wells to be properly abandoned before mining begins.

ADEQ response

These wells will be abandoned (please refer to response 68.16).

68.18. The San Carlos Irrigation Project's Northside Canal runs through proposed well field that will be operable within the first 10 years of proposed operations. The canal is planned for major rehabilitation work during that same

period under the Arizona Water Settlement Act of 2004. The permit should address, with reasonable specificity, how mining operations will be impacted by the work. If necessary, permit amendments should be required to address those impacts and any changes in mining operations required. Additionally, the applicant should describe changes in groundwater flows that could arise from rehabilitation, which likely will reduce recharge currently occurring from the Northside Canal.

ADEQ response

The Northside Canal is not a permitted facility under the PTF APP or Sitewide APP. Any changes in leakage from the canal as a result of rehabilitation work will be addressed in the annual groundwater modeling update (please refer to response 68.3). ADEQ does not anticipate the need for changes to the permit in response to canal rehabilitation work.

68.19. It is not clear where the applicant will obtain make-up water and in what amount for mine operations and water supply. Because groundwater pumping for make-up water can impact operations, this should be explained and addressed in the permit as necessary.

ADEQ response

As stated in the Florence Copper application, makeup water will consist of formation water from wells outside of the ISCR wellfield area and/or treated water from the ISCR wellfield. The nominal makeup water flow rate is estimated at 760 gpm with an estimated maximum rate of 935 gpm. All process solutions and injectate must meet the BADCT Requirements in Section 2.2 of the APP. Rinsing of the resource block is addressed further in Section 2.9.1.1, which requires that hydraulic control be maintained during closure rinsing activities. See application Attachment 2, Design Flow, EXHIBIT 2-1, Design Flow Calculations Technical Memorandum dated June 12, 2019, Haley and Aldrich, and Figures 6-1 Florence Copper Operations Flow Sheet and 6-2 Florence Copper Rinsing Flow Sheet.

68.20. It is not clear where the applicant will obtain groundwater for rinsing, other than that it will be obtained from wells "outside of the ISCR wellfield area." The applicant should be required to describe the location of source wells, the aquifers from which they withdraw water, and the water quality at the wells. The applicant should be required to evaluate the removal of water for rinsing on ongoing ISCR operations; on groundwater flow and the interaction of the Lower Basin Fill Unit (LBFU) and Oxide Zone; and on the Upper Basin Fill Unit (UBFU), LBFU and Oxide Zone generally in the area. The applicant should demonstrate that pumping for rinsing will not cause migration of mining contaminants. The applicant should be required to demonstrate that rinsing with water from the listed source or sources will not degrade water quality where rinsing is occurring or downgradient. The applicant should be required to demonstrate that there is enough formation water in storage at the indicated wells to complete rinsing over the project's life.

ADEQ response

It is not anticipated that hydraulic stresses related to pumping activities outside the well field will have any impacts on BADCT containment of mining solutions. Furthermore, any changes in hydrologic conditions that could impact ISCR operations will be evaluated in the annual modeling update. Florence Copper production wells used for rinsing are permitted and regulated under ADWR. Also, please refer to responses 68.3, 68.19, and 68.21.

68.21. The applicant proposed using treated water for rinsing, although it is not entirely clear what is meant by "treated water." ADEQ should not allow the applicant to inject treated water from the ponds or impoundments for rinsing absent additional hydrologic investigations, detailed characterization of impounded solutions, an explanation of the treatment process, and incorporation of PTF data into the analysis.

ADEQ response

Treated water refers to water extracted from the ISCR well field and treated through reverse osmosis and acid neutralization before it is re-circulated for further rinsing. The flow stream economizes the amount of water used to rinse the formation and the resulting number of water impoundments required to evaporate the residual rinse water. Please refer to response 68.19 in regard to rinsing.

68.22. The permit does not account for and provide for controls on the accumulation of radiochemicals in the aquifer or ISCR process wastes. This mine site is known to contain high levels of radiochemicals. Alert Levels for radiochemicals have been exceeded at this site historically and have been exceeded repeatedly during PTF operations. It is reasonable to assume such exceedances will only increase during commercial operations, because radiochemicals likely will be concentrated in mine process and waste streams, including "stacked" mining solutions that will be re-injected into the

aquifer during commercial operations. The permit is devoid of any plan for addressing radiochemicals leaching into the aquifer; contains inadequate and unreasonably limited requirements for sampling and testing; and fails to address radiochemical wastes that will be stored and accumulated in the various surface and groundwater handling units. The potential risks to human health and the environment of such mining in an area zoned for residential and commercial uses should be self-evident and should be clearly addressed in the permit.

ADEQ response

ADEQ believes there are several controls in place to minimize accumulation of radiochemicals or other potential contaminants, which include sampling and analysis of PLS and raffinate ponds (refer to Permit Section 2.5.1), and formation rinsing (refer Permit Section 2.9.1.1). In addition, geochemical modeling of the process streams does not indicate the accumulation of radiochemicals or other contaminants in the aquifer or process stream (please refer to Exhibit 10-1 and Response 68.12)

The Florence Copper is currently addressing recent AL exceedances for gross alpha through verification sampling and analysis in accordance with the site's APP Permit and UIC Permit. Gross alpha in Wells M58-O, M59-O, M60-O, MW-01-O exceeded the corresponding AL established for the PTF APP during 2nd Quarter of 2020. Gross alpha was also exceeded above the AL at M60-O during the 3rd Quarter of 2020. However, gross alpha is only an indicator parameter for adjusted gross alpha, which has an established AWQS of 15 pCi/L. The adjusted gross alpha is calculated by subtracting radon and total uranium (the sum of uranium 238, uranium 235 and uranium 234 isotopes) radiochemical activities. The AL exceedances at M58-O, M59-O, M60-O, and MW-01-O triggered the adjusted gross alpha calculation which resulted in radiochemical activities less than the corresponding AL and AQL.

Well M60-O is a supplemental monitoring well in the Florence Copper PTF APP (106360); this well is not required to monitor for radionuclides (see Table 4.1-6B Quarterly Operational Groundwater Monitoring) On October 5, 2020, Florence Copper became aware of a potential EPA UIC permit AL and AQL exceedance for Adjusted Gross Alpha at monitoring well M60-O from a sample collected on September 24, 2020 The laboratory result for this sample was 29.9 ± 3.8 pCi/L. The AL and the AQL for adjusted gross alpha are both 17.4 pCi/L for this well. As outlined in Parts II.H.2.a. and II.H.2.b. of the UIC Permit, Florence Copper notified EPA Region 9 that the verification sample collected on October 8, 2020 and received on October 28, 2020 confirmed the AL/AQL exceedance with an Adjusted Gross Alpha result of 18.7 ± 2.5 pCi/L. As required by the EPA UIC Permit, Florence Copper will submit a written report within thirty (30) days (on or before November 27, 2020) providing an evaluation of the cause, impacts, or mitigation of the AL/AQL exceedance.

In regard to addressing BADCT for process solutions, injectates, and aquifer restoration please refer to response to comment 68.19.

68.23. Permit Section 2.1 The permit does not clearly define "ISCR Area" and the term is not used consistently throughout the permit. This term should be defined and used consistently to avoid confusion with other areas described in the permit.

ADEQ response

In a few instances, the "Area" wasn't capitalized; this will be done in the final permit for consistency. The ISCR Area is defined in Figure 7-1 of the permit application and is within the Pollution Management Area, which is defined in Figure 7-2. Section 2.1 of the APP also provides a definition of the ISCR Area: "The ISCR Area covers an area of approximately 212 acres and is divided into resource blocks for planning purposes. Each resource block measures 500 feet by 500 feet and will include approximately 61 injection and recovery wells." In a few instances, the "Area" wasn't capitalized; this will be done in the final permit.

68.24. Permit Section 2.1 and 2.3.2: The permit allows evaporation from the Process Water Impoundments to be "enhanced through the use of mechanical evaporators." There were reports during PTF operations that mechanical evaporators on the PTF impoundment were spraying impoundment fluids beyond the impoundment berms, especially on windy days. Pinal County is not regulating the operation of the mechanical evaporators through its air quality permit for the facility. The permit should expressly require the applicant to seek inclusion of mechanical evaporators in its air quality permit through an appropriate amendment.

ADEQ response

See response to comment 59.5.

68.25. Permit Section 2.1: The permit states that "The anticipated duration of injection and recovery operation for each well is approximately 4 years." It then says "each well" will be removed from "injection/recovery service" when no more copper is available. Recovery wells should not be removed from service if they are required to maintain hydraulic control in an active mine block. The permit then states that wells removed from service will be used for rinsing while "injection and recovery operations continue in other areas of the ISCR area." It is not clear what is contemplated in this sequence of events - is rinsing to begin in one part of a mine block while ISCR operations continue in another area of the same mine block? Or is the reference to "other areas of the ISCR area" intended to mean that operations will continue in other mine blocks only?

ADEQ response

In this context, "taken out of injection/recovery service" means that the wells will not be used to inject lixiviant and extract copper solutions; it doesn't mean the wells will be closed/abandoned, which is clear further clarified in the next sentence that indicates the wells will be used for rinsing. The permit allows for one portion of a mine block to start rinsing before another portion is finished with ISCR operations. It does not mean that the whole mine block must begin rinsing.

68.26. Permit Section 2.1: The application materials do not explain how laboratory data and geochemical modeling support the assumption that extraction will be conducted for 4 years and rinsing for 2 years. These numbers are stated in a conclusory fashion with inadequate support and should not be assumed for permitting purposes without additional explanation.

ADEQ response

The forecast composition of the resource blocks during ISCR and rinsing operations is provided in Exhibit 10-1 (Hydrogeologica Technical Memorandum). The geochemical model incorporated results from Pressure Rinse Tests (PRTs) of core samples of the Bedrock Oxide Unit that were used to estimate copper extraction kinetics, PLS grade, and acid consumption. Although the leaching/extraction and rinsing phases are expected to last 4 and 2 years, respectively, more or less time may be needed for each step. The permit does not restrict Florence Copper to specific timeframes.

68.27. Permit Section 2.1: No explanation is provided for allowing 6 months between completion of injection and recovery and rinsing. It is not clear what is meant by "subject the availability (sic) of a sufficient number of wells to effectively rinse the mined area."

ADEQ response

The six month period between ISCR and rinsing allows for operational flexibility. For example, the configuration of wells that are no longer actively injecting lixiviant may not be conducive to beginning rinsing operations. It's noteworthy that hydraulic control must still be maintained, but some wells may not start rinsing until there are a block of contiguous wells to make rinsing successful. Hence, the "subject to the availability" reference.

68.28. Permit Section 2.1: The permit states that rinsing will "return the injection zone to preleaching water quality conditions." This is incorrect, as evidenced by the rinsing standards discussed in Section 2.9.1. The applicant is not required to return the aquifer to pre-mining, ambient conditions.

ADEQ response

The applicant is required to return the resource block to the water quality conditions as defined by the Table 12 parameters and corresponding AWQS and/or resource block ambient concentrations for those parameters with AWQS. Rinsing will be deemed complete when mine block concentrations are less than background pre-mining concentrations or AWQS, whichever is greater in accordance with A.A.C. R18-9-A205(C).

68.29. Permit Section 2.1: The commenter appreciates the requirement that the applicant provide a rinsing demonstration report before commercial operations begin. It is vital to future beneficial use of the aquifer that this demonstration be made as a prerequisite to further activity at the site.

ADEQ response

Comment acknowledged.

68.30. Permit Section 2.1 Table 1: The location coordinates in Table 1 represent points on a map and do not accurately delineate the large surface areas encompassed by the listed facilities. A map of the proposed locations, as provided in the permit application materials, should be included in the permit.

ADEQ response

The permit approves the design plans provided with the application. There is no need to include the map as part of the permit.

68.31. Permit Section 2.1 Table 1 lists the locations of impoundment 1 through 5 as "to be determined." The applicant provided coordinates for and maps of the proposed impoundment locations. It is not clear why these were not incorporated into the table.

ADEQ response

The Application Table 11-1, provides one set of coordinates for the group of 5 water impoundments; individual coordinates were not provided. Table 11-1 will be noted to indicate the center point of the impoundments. The approved design drawings and maps provide the location and layout of the water impoundments in sufficient detail.

68.32. Section 2.2.3(1): The permit does not define "ISCR well field boundary." Therefore, the permit is unclear whether the applicant must close all boreholes and wells across the entire site before beginning injection at any mine block or if boreholes and wells within 500 feet of each mine block must be closed before injection at that mine block, such that boreholes and wells would be closed over time under the applicant's sequential mining of the ore body.

ADEQ response

The permit language has been revised to indicate "ISCR resource blocks" instead of "ISCR well field boundary". The intent is to allow the boreholes and wells to be closed over time.

68.33. Section 2.2.3(1): No justification could be found in the application or permit for the requirement to close boreholes within 150 feet of ponds & impoundments, as opposed to 500 feet for the well fields.

ADEQ response

The ponds are lined and not expected to leak due to BADCT design, which differs from the BADCT requirements for the ISCR well field, which must also meet the stricter UIC requirement that all borings and non Class III wells within 500 feet of the well field be abandoned.

68.34. Section 2.2.3(1): The application referenced "known" wells and "known" boreholes. The applicant has previously acknowledged that some on-site boreholes and wells could not be found. To ensure that no unnecessary preferential pathways exist for mining contaminants, the permit should expressly require the applicant to locate and close all such boreholes and wells, as was required for the PTF facility.

ADEQ response

Florence Copper was required by EPA to rigorously locate known wells and borings using surface geophysics, field reconnaissance, and shallow excavations. After these efforts to locate the missing borings and wells had been made, EPA concluded that these wells (based on known locations) had been abandoned but not properly documented.

68.35. Section 2.2.3(2): The permit requires that all Class III wells meet mechanical integrity testing requirements of Underground Injection Control Permit R9UIC-AZ3-FY11-1 (UIC permit). This requirement is critical given that these wells contain highly toxic solutions under pressure. But this same permit requirement was not enforced for the PTF. The tests were not performed at all for several PTF wells. Recovery wells R-08 and R-09 failed their mechanical integrity tests but the permit violations were waived subject to the applicant conducting other short-term tests that, even if passed, would not ensure long-term permit compliance. Given the thousands of wells that the permit allows at this site, rigorous enforcement of these requirements is essential.

ADEQ response

Recovery wells R-08 and R-09 both passed the Part I and II MIT requirements in the PTF UIC Permit. It is acknowledged that the cement bond logs for both wells resulted in bond indexes lower than that of the other Class III PTF wells. However, these wells passed the required temperature logging that was performed during February 2019, which confirmed that both wells passed external mechanical integrity in compliance with Part II.E.3.a.ii.B of the UIC Permit. Furthermore, very large borehole (VLB) geophysical surveys were conducted in both wells to evaluate potential deficiencies. The VLB data was used to generate a Cement Attenuation Decay Index (CADI). The resultant CADI data indicated consistent cement density throughout

the tested interval in both wells. For both wells, the CADI data also indicated uniform cementation throughout the well annulus, which also indicates no grout channels. These tests affirmed that the Part I MIT requirement had been achieved. It's also notable that both wells passed the standard annular pressure test (SAPT) in accordance with the Part I MIT Requirement. The MITs are provided in Exhibit A-3, PTF Well Construction Records of the PTF UIC Application.

68.36. Section 2.2.3(2): The permit requires that all Class III wells be drilled, cased and cemented according to the requirements of the UIC permit. But an Oct. 9, 2018 summary report for the PTF documented without explanation that monitoring wells M55-UBF, M56-LBF, M61-LBF, and MW-01-LBF all failed their required annular pressure tests, and there were failures in cementing of the well annulus. Given the thousands of wells that the permit allows at this site, rigorous enforcement of these requirements is essential.

ADEQ response

These wells will not be used for injection but rather will only be used for monitoring groundwater. It should be noted that the UIC regulations at 40 CFR § 146.8(a) only require a demonstration of internal mechanical integrity for Injection wells (not these monitoring wells) Furthermore, these wells are completed in shallower zones above the Oxide Bedrock Unit where the zone of injection occurs. Therefore, there is no risk of upward excursion of mining solution into the overlying units (i.e., UBFU and LBFU). Florence Copper believes the steel casing and o-rings used did not create an adequate seal needed to pass the SAPTs. This was not an issue for the Class III wells that were constructed of fiberglass casing, which all passed the SAPT. However, the steel construction of these wells is adequate for the purpose of groundwater monitoring as no conduit to the Bedrock Oxide Unit exists. It should be noted that injection and recovery of lixiviant and PLS will not occur at these wells. Note that EPA has also approved these wells for groundwater monitoring under per EPA's November 15, 2019 Letter to Ronnie P. Hawks regarding the "Response to Letter dated September 5, 2019 regarding the Class III Underground Injection Control Area Permit No. R9UIC-AZ3-FY11-1 for the Florence Copper, Inc. Production Test Facility".

68.37. Permit Section 2.2.3(3): The permit requires aquifer pump tests to "optimize knowledge of subsurface characteristics particularly within the targeted in-situ leaching zone." The permit should also require testing that optimizes knowledge of conditions at the Oxide Zone-LBFU contact; at and around known faults; at and around the underground mine workings; and at or around other known and potential areas where conditions could interfere with hydraulic control or aquifer restoration.

ADEQ response

ADEQ does not believe additional permit requirements are needed. The aquifer pump tests will be conducted in each resource block to determine whether hydraulic control can be established. The aquifer testing will occur routinely as the well field expands during ISCR Operations, which will subsequently diagnose boundary effects such as faults, underground mine workings and any other conditions that could interfere with hydraulic control. It's also noteworthy that the aquifer test plan for each resource block will require approval from EPA per the UIC permit.

68.38. Permit Section 2.2.3(3) and 2.7.4.3(1): The permit does not appear to require a work plan for the required aquifer tests. The requirement for aquifer pump tests should include express minimum requirements for the tests, such as the number of wells, location of wells, pumping duration, etc., against which the applicant's Pre-Operational Report can be measured. The permit should expressly require that aquifer pump tests, at a minimum, comply with USEPA, Ground Water Issue: Suggested Operating Procedures for Aquifer Pumping Tests, EPA/540/S-93/503, at 2 (February 1993).

ADEQ response

An aquifer testing plan will need to be approved by EPA prior to each resource block expansion. Note that on 22 March 2018, Florence Copper submitted the "Notification of Intent and Scope of Planned Formation Testing for the PTF Area" (the "Plan"; Florence Copper, 2018), pursuant to requirements of the UIC Permit. The Plan provided details to the EPA and ADEQ regarding the planned execution of formation testing required under Part II.A.2 of the UIC Permit and under Section 2.7.4.3 and Section 3.0 of the APP. Approval of the Plan was received from the EPA in a letter dated 3 May 2018, and via email from ADEQ on 9 May 2018 with clarification made via email communication.

68.39. Permit Section 2.2.3(3): Aquifer testing for the PTF was conducted in May 2018, at a time when BIA irrigation production well 10B, located approximately 1,000 feet from the PTF well field, was actively pumping. This was not

mentioned in the applicant's August 2018 formation testing report. The permit should expressly require that no pumping occurs during aquifer tests that could impact the results and reliability of the aquifer tests. This has been noted as a problem in the applicant submittals to ADEQ; see Significant Amendment Application, Exhibit 14-2, Golder & Assoc., *Data Report for Initial Interpretation of the Hydraulic Tests at the Florence Mine Site*, at 43-60 (Nov. 1995).

ADEQ response

Hydraulic influence from the BIA irrigation wells was not expected to be significant given that these wells were pumping from a different hydrostratigraphic zone. Note that the BIA irrigation wells will be plugged and abandoned during the Sitewide ISCR Operations. In regard to the May 2018 aquifer testing within the PTF well field, hydraulic stresses from BIA irrigation wells were not evident in the hydraulic responses in the pumping or observations and subsequently had little or no effect on the estimated hydraulic parameters.

68.40. Section 2.2.3(3): The permit should expressly require the applicant to explain and account for the impacts of ISL activities in adjoining mine blocks on the aquifer test results. For example, it appears ISL mining will be active in well blocks for years 1 and 2 when aquifer testing for years 4 and 5 is being conducted. Such interference with aquifer tests has been noted as a problem in the applicant's submittals to ADEQ; see Significant Amendment Application, Exhibit 14-2, Golder & Assoc., *Data Report for Initial Interpretation of the Hydraulic Tests at the Florence Mine Site*, at 43-60 (Nov. 1995).

ADEQ response

Hydraulic influences from other ISCR wells will be evaluated as part of the aquifer test analysis please refer to Response 68.37).

68.41. Permit Section 2.2.3(4): It is not clear what "adjacent resource blocks if applicable" refers to.

ADEQ response

Note that ADEQ has revised the permit language as follows: add "and" just before "adjacent". In context, this section indicates the permittee will propose

"...well bore electrical conductivity alert levels for each resource block based on baseline electrical conductivity measurements from the annular conductivity devices within the resource block, and adjacent resource blocks if applicable,..."

68.42. Permit Section 2.2.3(4): PTF alert levels were increased for electrical conductivity through an Other Amendment to address exceedances attributed to precipitation. As this is a known issue, the permit should expressly state how the issue is to be addressed.

ADEQ response

Bulk Resistivity Monitoring was not proposed by the applicant and is not included in the Sitewide Permit. Rather, Annular Conductivity Device (ACD) sensors will be used to monitor potential lateral and vertical excursions of mining solutions through the well annulus and formation. The ACD sensors will be installed, on all Class III wells (Injection, Recovery, Observation and Perimeter Wells). Florence Copper and EPA are currently revising the proposed locations of the ACDs in relation to the MFGU, LBFU and Oxide Unit. ADEQ has added a compliance schedule item to the APP that requires Florence Copper to update the ACD monitoring requirements once the UIC monitoring requirements are finalized. The change in monitoring devices addresses the issue of precipitation affecting the Bulk Resistivity monitoring results.

68.43. Permit Section 2.2.3(5): The permit requires that ambient groundwater concentrations in a resource block be established to determine pre-mining concentrations in ISCR wells. In some cases, resource blocks will be opened downgradient of ongoing ISCR operations or already-mined resource blocks. For instance, the Year 4 resource block will be opened while the Year 2 resource block is being mined immediately adjacent and upgradient. No groundwater quality monitoring is required between the two adjacent resource blocks to demonstrate that contaminants from the Year 2 resource block are not migrating into the Year 4 resource block, thereby skewing the "ambient" groundwater concentrations in the latter block. The commenter has found nothing in the record that addresses this possibility. This problem is illustrated by the applicant's recent exceedance (Feb. 21, 2020) at M59-0, which was blamed on redevelopment of nearby Observation Well 0-02. According to the applicant, "The redevelopment likely released calcium and sulfate from dissolution of the gypsum, which may have been picked up by M59-0 as it was being pumped for the sampling events." If this can happen during well redevelopment, it certainly can happen during active ISCR operations.

ADEQ response

Note that POC wells downgradient of resource blocks have provided adequate background baseline data prior to operation of the well field. The intent of the resource block ambient monitoring is to provide baseline data specific to the given resource block. ADEQ will closely evaluate the ambient resource block data through comparison to POC well data and groundwater data acquired from other resource blocks. Skewed data sets or outliers will be carefully considered when assessing ambient concentrations for a given resource block.

68.44. Permit Section 2.2.4(3): The draft permit requires injection only into the Oxide Zone but does not prohibit migration of contaminants from the Oxide Zone into the LBFU. Because contaminants can pollute the LBFU long before they reach Point of Compliance (POC) wells, because only some POC wells are screened in the LBFU, and because contaminant levels at the distant POC wells may not be indicative of contaminant levels in the LBFU (due to dispersion, attenuation, etc.), the permit is not reasonably protective of the local drinking water aquifer. The permit should expressly prohibit mining contaminants in the LBFU. The applicant should describe how contaminants will be prevented from leaving the Oxide Zone and migrating into the LBFU where there is a steep contact between the two units within the ISCR area.

ADEQ response

Given that the PTF injection zones lies within the transition to the graben structure (please refer to the cross sections in Exhibits 14-1d, 14-1e, and 14-1f), Florence Copper has demonstrated hydraulic containment of mining solutions in areas that have a steep contact between the LBFU and Bedrock Oxide Unit (please refer to Response 68.4). Note that the ACD monitoring at the Injection, Recovery, Observation and Perimeter Wells will provide early detection of mining solutions should an excursion occur (Please refer to Response 68.42).

68.45. Permit Section 2.2.4(5), 2.6.2.9 & Table 15: The permit requires monitoring for hydraulic control with an Alert Level for Fluid Electrical Conductivity specified as "Observation well conductivity equal to or greater than injection well conductivity. PTF data has shown observation well conductivity to be orders of magnitude lower than injection well conductivity. An exceedance of the draft permit's Alert Level would represent a significant failure of the hydraulic control system and is inherently unreasonable and unprotective of groundwater. The permit should set the Alert Level based upon a specified level of exceedance above baseline data.

ADEQ response

The Fluid EC monitoring system is designed to provide early detection of mining solutions in the event hydraulic containment is breached. As designed, Fluid EC monitoring of the Observation wells provides an indication that injected solution is moving outside the containment zone. Note that Fluid EC is measured daily to provide an early indication of injected fluid movement. Hydraulic control is also monitored through daily water level measurements, daily injection and recovery rates, and ACD monitoring.

68.46. Permit Sections 2.2.4(5), 2.6.2.9 & Table 15: The Alert Level for Fluid Electrical Conductivity is triggered only if exceeded at all Observation Wells, an unreasonable requirement in that it is foreseeable that a problem with containment can be indicated by an exceedance at just one Observation Well.

ADEQ response

The commenter has misinterpreted the permit requirement. If any one Observation well exceeds the alert level, the contingency actions are triggered.

68.47. Permit Sections 2.2.4(5), 2.6.2.9 & Table 15: Under the permit standard for fluid electrical conductivity, an escape of 99.99% leachate solution to an Observation Well hundreds or thousands of feet away would not trigger the Alert Level. But such an escape would represent a significant failure of the hydraulic control system. This Alert Level is inherently unreasonable and unprotective of groundwater. The permit should set the Alert Level based upon a specified level of exceedance above baseline data.

ADEQ response

The commenter has misinterpreted the permit requirement. The proposed resource blocks will measure 500 feet by 500 feet. The minimal distance between Injection wells and Observation wells will not be spaced at "hundreds or thousands" of feet. For example, at the PTF Observation wells O-07, O-01, and O-02 are spaced approximately 110 feet from Injection well, I-01. The proposed wellfield configuration for the sitewide ISCR operations will be similar to that of the PTF.

Florence Copper provided additional detail in a letter to EPA dated September 24, 2020 and Figure A-19, which explain the configuration of Perimeter, Observation and POC wells to show hydraulic control as the

well field progresses. Please refer to Response #68.46 in regard to contingency actions related to alert level exceedances

68.48. Permit Section 2.2.4(6) & Table 15: Monitoring of injection and recovery volumes and hydraulic gradients are designed to demonstrate hydraulic control across an active mine block. But hydraulic control can vary at locations within the mine block due to localized faulting, fractures, and preferential flow paths. BADCT monitoring in the permit will not necessarily detect such variations, which could lead to migration of contaminants into the LBFU and UBFU. Monitoring of the LBFU and UBFU should be required within each mine block that will allow early detection of vertical fluid migration into the LBFU or UBFU and lateral migration into the LBFU adjoining the Oxide Zone.

ADEQ response

Preferential flow paths through speculative secondary permeability features such as faults was not evident in the PTF operations or during pre-operational aquifer testing. Note that routine BADCT monitoring will be conducted to demonstrate hydraulic containment for each resource block (please refer to Table 15, Section 4.2). In addition, the ACD EC monitoring is designed for early detection of lateral and vertical excursions of mining solutions (please refer to Response 68.45). ADEQ may also augment the placement of Observation and Perimeter wells to better monitor potential preferential flow paths if warranted from the pre-operational aquifer testing.

68.49. Permit Sections 2.2.4(5), 2.6.2.9 & Table 15: The permit requires one Annular Conductivity Device installed above the MFGU or 200' above the Oxide Unit, whichever is less. This could allow ISCR fluids to migrate into the LBFU before being detected, especially where injection wells are screened in a fault zone, as the applicant has acknowledged. ACDs should be required at the Oxide Zone-LBFU contact.

ADEQ response

See response to comment 68.42.

68.50. Permit Sections 2.2.4(5), 2.6.2.9 & Table 15: The Alert Level in Table 15 for Well Bore Electrical Conductivity is not clear. The Alert Level reads "see below/" which is not a clear reference. The Resource Block numbers in the Table do not appear to reference Resource Block numbers in available maps and drawings.

ADEQ response

Table 15 will be revised to change "See below" to "See Well Bore Electrical Conductivity at ACD Sensor Alert Levels below". The Resource Block numbers in the Table correspond to the Resource Blocks planned for the first year of ISCR operations. See Florence Copper documents: Conceptual Basis of Commercial Scale ISCR Wellfield Development Sequence, Florence Copper Project, Figure A-1 Proposed Area of Review (shows Resource Block numbering) and Figure A-2 Planned Wellfield Development Sequence (shows development sequence for years 1 through 16).

68.51. Permit Sections 2.2.4(5), 2.6.2.9 & Table 15: Electrical Conductivity monitoring in the permit detects vertical migration along the well casing/annular seal, but not in the aquifer formation itself. It is, therefore, not a substitute for bulk Electrical Conductivity monitoring. Without bulk conductivity monitoring or a reasonable substitute form of monitoring, vertical excursions of contaminants into the LBFU may go undetected.

ADEQ response

Note that the ACD device has been re-designed to detect to detect changes in EC within the formation. The re-designed ACD will be comprised of two stainless steel well casing centralizers spaced 3 feet apart and will serve the same purpose (monitoring the micro-annulus) as the original ACDs. The re-designed ACDs will have the added advantage of being in contact with the formation at the borehole wall and will facilitate detection of electrical conductivity changes induced by fluid migration through the lower basin fill unit (LBFU). As a result, the proposed re-designed ACDs will simultaneously monitor conductivity of fluids migrating through the microannulus (should one develop) and vertical excursion of injected fluid in the formation adjacent to the ACD. See also response to comment 68.42.

68.52. Permit Section 2.2.4(7) & Table 15: The permit requirements for monitoring the cone of depression in 2.2.4(7) and Table 15 are inconsistent. Section 2.2.4(7) requires a higher groundwater elevation at the Pollution Management Area (PMA) boundary than at wells completed in the Oxide Zone in an active mine block. Table 15 requires the elevation at the PMA boundary to be lower than at "the downgradient ISCR Observation Well." The correct standard relevant to the PMA boundary should be provided. In addition, the permit should be revised to clearly delineate which

wells or categories of wells will be monitored for this requirement (and how many, as appropriate) as it not clear in this draft.

ADEQ response

The commenter has misinterpreted the permit requirement. Please note that Section 2.2.4.(7) states the requirement and Table 15 states the prohibition. For example, the expected condition to maintain hydraulic control is for groundwater elevations at the PMA boundary to be greater than those observed towards the center of the well field, which would be indicative of an inward hydraulic gradient. The prohibition in Table 15 correctly alerts of potential loss of hydraulic control when observed groundwater elevations are lower at the PMA boundary than those observed near the center of the well field (i.e., Perimeter and Observation wells). Note that the Table 15 states that water levels measured at all Perimeter Wells, Observation Wells, and POC Wells will be used to construct the potentiometric surface maps.

68.53. Permit Section 2.2.4(8) & Table 15: The draft permit assumes that hydraulic control is maintained and the aquifer is protected if "the total volume of solution recovered is 106% or greater than the volume of solution injected, averaged over a 24 hour period." The permit mischaracterizes recovery; recovery wells will recover both ISCR solutions and fresh groundwater. The permit does not require that 106% recovery consist entirely of leachate solution; recovery of fresh water satisfies the permit. Based on available PTF data, this same requirement has never been violated during PTF operations, even when mapped flows are outward from the mine. This is evidence that there are times when this standard was met by pumping fresh water in addition to leachate solution and is, therefore, not a reliable indicator that hydraulic control is being maintained.

ADEQ response

Note that the 6% overpumping requirement ensures that the cone of depression and inward hydraulic gradients are maintained during ISCR operations. This is just one of several BADCT requirements for maintaining hydraulic control (refer to Table 15). Exceedance of ALs for any of the BADCT parameters will trigger contingency actions specified in Section 2.6.2.6.

ADEQ acknowledges that the recovered water is a mixture of "fresh water" from the surrounding formation and mining solutions within the wellfield. As the PTF data demonstrates, the overpumping requirement has proved effective in maintaining hydraulic control. Furthermore, it demonstrates EPM and hydraulic connection beyond the wellfield as groundwater has been continuously drawn towards the PTF since December 2018. This would not be possible if extreme heterogeneities existed as speculated in Comments #68.4 through #68.8.

68.54. Permit Sections 2.2.5 and 2.9.1.1: The permit expressly allows sulfate to remain in the aquifer at 3 times the secondary drinking water standard. The applicant has demonstrated through its groundwater model that this plume will migrate off-site. In doing so, it will necessarily enter the LBFU downgradient of the ISCR area because the LBFU is deeper than the Oxide Zone in areas downgradient. As a result, sulfate will contaminate the drinking water aquifer, requiring expensive treatment to make the water drinkable. The permit should require restoration of the aquifer to the secondary drinking water standard of 250 mg/L for sulfate and should establish contingencies now for impacts to drinking water supplies in the future.

ADEQ response

As required in Permit Section 2.9.1.1, the sulfate closure rinsing standard is 750 mg/l rather than the secondary water standard of 250 mg/l. The rinsing standard applies to groundwater within the PMA. Florence Copper conducted model simulations to evaluate the DIA during the post-closure period of 30 years after formation rinsing is completed and hydraulic control pumping has ceased. The post-closure DIA was defined using sulfate because the raffinate is a sulfuric acid-based solution, and over the life of the proposed operations, a substantial quantity of the raffinate will be circulated through the ore body. By mass, sulfate comprises the greatest quantity of material to be removed during restoration activities. The greatest areal extent of sulfate migration as a result of operation of discharging facilities proposed under this APP application was defined at a sulfate concentration of 2 mg/L above background conditions. The simulated maximum distance of down-gradient migration of sulfate was approximately 2,000 feet beyond the ISCR area in the lower portion of the LBFU. Thus, the model does not indicate that a plume of sulfate at a 750 mg/l concentration will move offsite.

Other modeling simulation findings include the following:

1.) Sulfate concentrations in the LBFU were simulated to be substantially lower than those within the Oxide Bedrock Unit, reaching a concentration of approximately 100 mg/L above background.

- 2.) Sulfate concentrations up to 600 mg/L above background in the Oxide Bedrock Unit were simulated 30 years after closure.
- 3.) Transport distribution of sulfate within the bedrock Oxide unit is limited to the fault zones and higher permeability of the Sidewinder Fault. Sulfate was simulated to migrate approximately 800 feet downgradient along the Sidewinder Fault.

The DIA groundwater modeling indicates that ISCR solutions are unlikely to be transported beyond the ISCR well field during operations. The modeling further demonstrates that after the closure criteria have been met, and after hydraulic control has been discontinued, ISCR operations will not cause or contribute to violations of the AWQS at the POC wells.

68.55. Permit Section 2.3.5 and Table 5: The permit should include more detailed requirements for inspection and use of the BHP impoundment pond. A portion of the pond is submerged; the pond water and sediment should be removed for complete inspection and testing. The applicant should be required to provide all historical inspection and monitoring records for the pond. ADEQ has previously noted concern that the trampoline effect in the primary and secondary liners has caused several holes and tears in the primary liner in the sump area and may also have impacted the secondary liner. To the extent tears are found that may have impacted soils, soil testing should be required.

ADEQ response

Florence Copper submitted a report titled CONSTRUCTION REPORT FLORENCE COPPER WATER IMPOUNDMENT POND LINER REPAIRS, prepared by Axexlrod, Inc., dated September 11, 2020. Prior to discharge to the pond, ADEQ will review this report and determine whether additional repairs or sampling is warranted.

68.56. Permit Sections 2.4, 2.3.10, Table 1, and Table 2: The permit does not include POC wells at or within 750 feet of the PMA respective to proposed water impoundments 1 through 5. The closest POC well overall, M52-UBF, is approximately 2,000 feet or more downgradient of western impoundments 4 and 5. The POC well closest to proposed water impoundment 1 is approximately a half-mile away. Given that leakage to groundwater and soil from liner failure or rips could continue unabated for months under the permit's contingency plan requirements (Section 2.6), the POC locations relevant to these impoundments are not reasonably protective of groundwater.

ADEQ response

As shown in Figure 12-1 in the APP application, M-32-UBF monitors groundwater downgradient of the proposed water impoundments. M33-UBF monitors groundwater downgradient of the proposed PLS and raffinate ponds. Note that M32-UBF will be added to the Sitewide permit. Additionally, the solution and water impoundments are double lined facilities (see response to comment 64.36).

68.57. Permit Sections 2.4, 2.3.7, 2.3.8, 2.3.9, Table 1, and Table 2: The closest POC well, M33-UBF, to the proposed PLS pond, proposed raffinate pond, and proposed runoff pond is more than 750 feet from the PMA line associated with those facilities. Given that leakage to groundwater and soil from liner failure or rips could continue unabated for months under the permit's contingency plan requirements (Section 2.6), the POC locations relevant to these impoundments are not reasonably protective of groundwater.

ADEQ response

The commenter has misinterpreted the permit requirement. M33-UBF is adjacent (approximately 100 feet) to the proposed PMA, downgradient of the PLS, raffinate, and runoff ponds (please refer to Figure 12-1 in the APP application). Additionally, the solution and water impoundments are double lined facilities (see response to comment 64.36).

68.58. Permit Section 2.4: The POC wells are spaced too far apart to reasonably monitor for escapes of pollutants across the entire perimeter of ISCR operations.

ADEQ response

The APP permit requires the monitoring of 32 POC wells to ensure compliance with AWQS in the UBFU, LBFU, and Bedrock Oxide Unit. The majority of these POC wells are located down gradient of the planned discharging facilities in accordance with A.R.S. § 49-244. The wells located upgradient of the ISCR well field serve the purpose of monitoring groundwater downgradient of surface impoundments and processing

facilities that are located in the eastern portion of the PMA. Figure 12-1 in the APP application shows that the monitoring wells are located at the edge of the PMA, which surrounds the planned ISCR well field.

The majority of the POC wells are located along the northwest boundary of the PMA, which corresponds to the primary direction of groundwater flow towards the northwest. These wells are appropriately located to detect the potential release of contaminants from the PMA. Additional BADCT monitoring within the PTF well field (refer to responses to comment 68.6, 68.42, 68.45, 68.48, 68.51) provides early detection of mining solution excursions should the cone of depression fail to provide containment of mining solutions. Note that ADEQ may amend this permit to designate additional POC wells should a failure in hydraulic containment occur or if acquired data from aquifer testing or BADCT monitoring warrant additional POC wells.

68.59. The permit requires 31 POC wells for a 212-acre ISCR area, most of which are carry-overs from POC locations approved in 1998. The 1998 permit incorporated a significantly different set of facilities and different PMA boundary than for the draft permit, but the commenter has found no demonstration in the application materials or the draft permit that these POC locations are justified based on the current operational plan, DIA, or PMA. Nothing has been found to demonstrate that the POCs approved in the 1990s are appropriately located and constructed to monitor downgradient groundwater quality under current conditions and the applicant's updated site configuration and operations.

ADEQ response

Please refer to response to comment 68.58. The POC Wells approved in the 1998 permit were based on the configuration of the PMA for the BHP Florence Copper Project which was located within the aquifer exemption boundary established in 1997 by EPA's UIC Permit No. AZ396000001 (now superseded) and incorporated into the current UIC permit for the Florence Copper site ([No. R9UIC-AZ3-FY11-1] see Section 12.4 of the Permit Application). Given the configuration of the ISCR well field and other facilities and the fact that the PMA has consistently remained within the aquifer exemption, the POC locations are appropriately located.

68.60. Permit Section 2.4: The permit requires 31 POC wells for a 212-acre ISCR area, most of which are carry-overs from POC locations approved in 1998. Of those, at least 5 are upgradient of any discharging facilities and therefore provide no monitoring of ISCR contaminants. Most of the remaining 26 POC wells are clumped together in just 9 well groups that are located too far apart to adequately monitor such a large area. In particular, on the critical western boundary of the mine (e.g. next to private property and future public supply wells) the LBFU POC wells are more than 1,000 feet apart, making it unlikely that an actual release will be detected.

ADEQ response

Please refer to response to comment 68.58. Attachment 12 of the APP application provides a description and rationale for the locations of the POC wells. Note that there are nine POC wells completed either in the LBFU or Bedrock Oxide Unit (O49-GL, P49-O, M16GU, M24-O, M15-GU, M14-GL, M22-O, 49-GLR, M8-O) along the western PMA boundary. The majority of the POC wells are located along the northwest boundary of the PMA, which corresponds to the primary direction of groundwater flow towards the northwest and appropriate for detecting offsite migration of a hypothetical plume. The well spacing in along the northwest corner of the PMA is approximately 500 feet rather than 1,000 feet apart.

The permit also requires extensive BADCT monitoring to demonstrate hydraulic control and detect excursions or release of pollutants.

68.61. Permit Section 2.4: The static PMA boundary and resulting POC well locations do not consider the dynamic nature of the ISCR area activities planned under this permit. At inception, mining will encompass just a small part of the ISCR area. The resource block slated for mining in the first year will contain numerous injection and recovery wells that will be far more than 750 feet from a downgradient POC well. Other resource blocks, such as the year 8 block, will contain no wells located within 750 feet of a downgradient POC well. In the later years of mining, there will be no active mining in the northwest half of the ISCR area, meaning that most of the resource blocks and the wells within them will be located more than 750 feet from a downgradient POC well. By the end of operations, the only discharging facilities will be the evaporation impoundments, which as discussed in another comment have no downgradient POC wells within 750 feet of their respective PMA boundaries.

ADEQ response

Please refer to response to comment 68.58. Note that the ISCR operations will occur within the PMA, and therefore the locations of the POC wells meet the requirements under with A.R.S. § 49-244. It's also

noteworthy that the groundwater in ISCR well field will be restored to meet AWQS or pre-operational ambient concentrations for those parameters with AWQS, per the requirements specified in Section 2.9.1.1. As part of the closure plan, rinse verification wells will be used to confirm aquifer restoration post-rinsing and will be left in place and available for additional monitoring throughout the duration of ISCR operations. These wells will provide additional groundwater information to supplement the POC Well monitoring.

68.62. Permit Section 2.4: The application contains a diagram of the “DIA During Operations” (Figure 14-2) which encompasses the entire ISCR area. That diagram cannot form the basis for a PMA relevant to the ISCR well field. The DIA for the well field will vary in location and size over the course of operations. At no single point in time with the DIA ever approximate this figure. In later years, for instance, the DIA will not and legally cannot include the northwest half of the ISCR area because that area will already have undergone groundwater restoration.

ADEQ response

The DIA is defined in A.R.S. § 49-201 as the “potential areal extent of pollutant migration, as projected on the land surface, as the result of discharge from a facility. Based on this definition, the “DIA During Operations” in Figure 12-1 is appropriate and meets the requirements specified in A202(A)(8)(b)(xii) and A202(A)(8)(b)(xiii). Please note that as described in Florence Copper’s application (including Florence Copper’s April 6, 2020 email and attachment), the DIA has been revised to include the ISCR Well Field, the pregnant leach solution (PLS) pond, raffinate pond, runoff pond, and water impoundments.

68.63. Permit Section 2.4: POC Wells M52-UBF and P49-0 are located inside the PMA, in apparent violation of ADEQ policy as testified to by ADEQ employees.

ADEQ response

Application Figure 12-1 includes the PMA line as described below, except that the PMA line does not correctly show that wells M52-UBF and P49-0 should be located outside the PMA. ADEQ reviewed both the text and figure and determined that the PMA meets the requirements of A.R.S. § 49-244.1 and guidance provided in the BADCT Manual for in-situ leaching applications. ADEQ considers the inconsistency between the text and figure a minor drafting error rather than an indication that the wells are improperly located.

Application Section 12.4 states, in part:

In addition to circumscribing the impoundments and ponds, the proposed PMA incorporates a horizontal space beyond the edge of the planned ISCR well field which contains the central portion of the cone of depression which is the appropriate barrier for ISCR operations. The proposed PMA shown on Figure 12-1 is formed by a line narrowly drawn to connect the outline of the planned water impoundments, proposed PLS pond, proposed raffinate pond, proposed runoff pond, existing BHP water impoundment, existing PTF water impoundment, existing PTF runoff pond, and a line connecting existing POC wells encompassing the planned ISCR well field. The existing PTF well field is located entirely within the planned ISCR well field and is consequently within the PMA line circumscribing the planned ISCR well field. The proposed PMA was developed in compliance with A.R.S. § 49-244.1 and guidance provided in the BADCT Manual for in-situ leaching applications.

68.64. Permit Section 2.4: The PMA incorporates large areas, especially upgradient of the ISCR area, upon which no contaminants will be placed. The PMA should be redrawn to better mirror the DIA for the ISCR area and impoundment; if needed, the PMA should be broken into individual boundaries for individual discharging facilities or adjacent groups of facilities.

ADEQ response

As currently configured the PMA encompasses all the discharging facilities and planned ISCR well field and is compliant with A.R.S. § 49-244.1 (see response to comment 68.63). ADEQ does not believe that separate PMA are warranted based on the design and locations of facilities, groundwater flow direction and location of POC wells.

The commenter refers to an area between the ISCR Area and the BHP Pond where pollutant discharge is not authorized. The BHP Pond is a double-lined facility with leak collection system and as such, it not expected to release pollutants to the aquifer. Therefore, making the BHP Pond a separate PMA is not warranted because it is upgradient from the ISCR well field which is monitored by multiple POC wells and an additional POC well immediately downgradient of the pond is not necessary to assure protection of groundwater.

The PTF Process Water Pond (double-lined with leak collection) and PTF Runoff Pond (single lined) are located at the northern edge of the PMA and POC Well M52-UBF is directly downgradient, therefore, making this area a separate PMA provides no additional groundwater protection.

The ISCR processing facilities including the PLS Pond, Raffinate Pond (both are double lined with leak collections system) and Runoff Pond (single-lined), are located along the northern edge of the PMA and POC Well M33-UBF is directly downgradient; therefore, making this area a separate PMA provides no additional groundwater protection.

The ISCR Water Impoundments 1 through 5 are double lined with leak collections system and as such are not expected to release pollutants to the aquifer. POC well M32-UBF is directly downgradient of the impoundments; therefore, making this area a separate PMA provides no additional groundwater protection.

However, the DIA has been revised to coincide with the footprint of the ISCR wellfield, PLS pond, raffinate pond, runoff pond, PTF water impoundment, and water impoundments (please refer to Response 68.62)

68.65. Permit Section 2.5: The permit requires monitoring in accordance with "currently accepted standards of professional practice." This could be interpreted as standards applicable at permit issuance. Given that monitoring likely will continue for decades and that monitoring standards change over time, the permit should be revised to require compliance with then-current standards any time the monitoring is conducted.

ADEQ response

The intent of this language is to convey that the permittee shall keep up with professional standards of practice that may change with time. Furthermore, ADEQ shall consider and may prescribe monitoring terms and conditions as necessary to ensure compliance with A.R.S. § 49-243(K)(1) through a permit amendment at any time during the mine life.

68.66. Permit Section 2.5.1 & Table 5: A single discharge monitoring event is unreasonable and inadequate for the listed ponds and impoundments. The applicant will be recirculating injected fluid during operations, an injection method that was not used in PTF operations and that has not been proven safe. Measuring discharges once within 90 days of the start of operations will not provide an accurate measure of the contaminants being discharged into the ponds and impoundments. Additional monitoring should be required until contaminant levels have stabilized, including monitoring of sediments.

ADEQ response

See response to comment 64.28. Additionally, pond closure activities will include characterization of sediments.

68.67. Permit Section 2.5.3: The applicant will be recirculating injected fluid during operations, an injection method that was not used in PTF operations and that has not been proven safe. "The recirculation will result in the accumulation of dissolved mineral constituents in these solutions." (Application Exhibit 2-1). Additional monitoring should be required to determine the impacts of these operations on groundwater conditions, which could be quite different than what was seen during PTF operations.

ADEQ response

The comment does not clearly state the difference between the PTF and proposed sitewide ISCR operations and is speculative given the demonstration of hydraulic control of the PTF operations. ADEQ believes that the circulation of the mining fluids at the PTF will be similar to that of the entire ISCR well field given the groundwater flow characteristics. Therefore, the BADCT monitoring (refer to Response 68.42, 68.47, 68.51, and 68.53), rinse verification, closure, and post-closure monitoring requirements are appropriate and in accordance with A.R.S. § 49-243(K)(1).

68.68. Permit Sections 2.5.3.3., Tables 13 and 14: The permit appears to have adopted Alert Levels proposed in the application and based upon an alternative statistical method for calculating the k value used to calculate the Upper Prediction Limit (UPL). The applicant was concerned with false positives. But the application contains no discussion of minimizing the false positive rate, through things like verification resampling, which is of equal importance in designing the monitoring program. The calculations are based upon wells in different aquifer units but the calculations should be performed individually for different units. The calculations also used an adjusted standard deviation without explanation or justification .

ADEQ response

The comment appears to refer to the UPL calculations in Exhibit 15-1. Please refer to Permit Section 2.6.2.5.1 for the required verification sampling in the event of an AL exceedance at monitoring wells. This requirement minimizes the occurrences of false positives. The ALs for constituents at the majority of the POC Wells were either based on 80% of the corresponding AWQS values or well specific ambient data if the background was higher than the AWQS. For those AL values greater than background, the calculations were derived from an intra-well (i.e., single well) statistical approach.

The only exception was the AL for sulfate at POC well M1-GL, which was based on ambient data from multiple wells that were completed within the same hydrostratigraphic unit. This approach was proposed in Florence Copper's October 25, 2019 Technical Memorandum (TM), which was prepared in response to ADEQ's concern regarding the use of an adjusted standard deviation as noted in the comment. The calculated AL (184.2 mg/L) proposed in the TM was based on sulfate data collected at POC well M1-GL and three additional wells completed in the same formation and screened at similar depths. The resulting UPL calculation was therefore based on an inter-well statistical approach in accordance with guidelines specified in the 2009 RCRA Groundwater Monitoring Unified Guidance (EPA 530-R-09-007 [USEPA, 2009]). ADEQ concurred with this revised approach and found it acceptable for establishing the AL (184.2 mg/L) for this well.

68.69. Permit Section 2.5.7: The arsenic narrative standard adopted for the PTF has been incorporated into this permit. That standard has little relevance to commercial operations, which will occur cross-gradient to the POC wells to be monitored. The UPL should be applied at multiple points downgradient of commercial operations, based upon sampling and modeling at relevant POC wells.

ADEQ response

The established UPLs for the wells in the northwest corner of State Mineral Lease Land are relevant given that these are directly downgradient of the PTF. ADEQ agrees to apply the UPL to the POC wells along the northern and western perimeter of the PMA, which are downgradient or sidegradient of the ISCR well field. Note that this would be a more conservative approach given that the AWQS for arsenic is 0.05 mg/l and the drinking water standard (MCL) is 0.01 mg/l. The established UPL for arsenic is 0.01 mg/L, which is consistent with EPA's drinking water standard for arsenic. Permit Section 2.5.7 has been revised to incorporate the UPL for arsenic at the following POC wells: UPL at M7-GL, M8-O, M6-GU, M26-O, M29-UBF, M27-LBF, M28-LBF, O19-GL, P19-1-O, O49-GL (replacement) M21-UBF, M20-O, M19-LBF, M31-LBF, M30-O, M24-O, M25-UBF, M16-GU, M17-GL, P49-O and O49-GL.

68.70. Permit Sections 5.8.1 & Table 15: As a measure of hydraulic control, the permit requires inward hydraulic gradients to be maintained. PTF operations were under the same requirement, in that the applicant was at all times to maintain an inward gradient toward the PTF well field that extended outward at least 500 feet (with the expectation that this will actually ensure a gradient extending out many miles, per the model predictions). Available data from PTF operations demonstrates that this requirement was violated. There are instances where the inward gradient barely extends beyond the mine itself. Ore body heterogeneity is confirmed on many of the monthly water table contour maps in the quarterly reports for the PTF and are likely evident in other data not available to the commenter. For example, Figure 3 in Attachment 1 of the applicant's Q4 2019 PTF monitoring report indicates inward flow extended out no more than 130 feet from the PTF boundary. The gradient beyond 130 feet (and thus well within the required cone of depression) sloped outward more than four feet between the Observation wells (elevations above 1,251 feet) and the POC boundary (1,247 feet at M54-O). It does not appear that the applicant has been required to account for these violations or submit corrective actions to resolve the problem and it does not appear that the permit takes the violations into account. In its August 10, 2020 review of the commercial application permit, ADEQ stated that "[t]he quarterly reports demonstrated that hydraulic control of the PTF was maintained throughout the PTF operations. Overall, hydraulic capture of the lixiviant solution was ensured by maintaining the cone of depression within the aerial extent of the PMA." This statement is clearly incorrect. The violation should have been addressed at the time and should have been considered in the drafting of this permit.

ADEQ response

The comment misinterprets the radius of influence of the PTF well field. Please refer to responses to comments 68.4 and 68.6 in regard to questions related to hydraulic control and aquifer heterogeneity. Note that Attachment 1 refers to "Graphical Representation of Injected and Recovered Volumes" in the Q4 2019 Quarterly Report. Hence, there is no Figure 3 in Attachment 1. ADEQ believes the comment refers to the

Potentiometric Contour Maps for December 2019 in Figure 3 of Attachment 3. The three maps depicted in this figure include 1) Minimum Groundwater Elevations; 2.) Maximum Groundwater Elevations; and 3) Average Groundwater Elevations. The purpose of these maps is to represent a theoretical high, low, and average water levels at each well rather than to show the radial extent of the well field. The contours for these maps only extend to the PTF well field boundary, which is reflected by the well control within the well field and subsequently an artifact of the contouring. Although these maps don't show the full extent of the cone of depression, the figure effectively demonstrates that inward gradients were maintained during December 2019.

The full extent of the cone of depression is demonstrated by the "Groundwater Elevation Contour Maps" in Attachment 8, which provide a larger scale view of the potentiometric surface that extends beyond the PTF wellfield. For example, Figure 3 shows a head difference of more than 12 feet between Recovery Well R-09 (1,239.12) and POC Well M22-O (1251.75 feet) at a distance greater than 1,000 feet. No corrective actions were required as Attachment 2 demonstrated BADCT compliance of maintaining a hydraulic gradient greater than a one foot differential between the observation and recovery wells on a daily basis.

68.71. Permit Section 2.5.8.1 & Table 15: The permit requires inward hydraulic gradients to be demonstrated through "four triplets" of wells, each consisting of one Recovery or Perimeter Well, one Observation well, and one POC well or "water level well." The permit does not define a "water level well" or explain where they will be located, how they will be constructed, their purpose, etc.

ADEQ response

The "water level well" reference has been removed from the permit. The original intent was to provide additional locations for measuring water levels to demonstrate inward hydraulic gradient. If additional wells are needed as the well field progresses, the permit will be amended to include the additional wells.

68.72. Permit Section 2.5.8.1 & Table 15: The permit requires inward hydraulic gradients to be demonstrated through "four triplets" of wells, each consisting of one Recovery or Perimeter Well, one Observation Well, and one POC Well or "water level well." Many resource blocks will be located so that the closest downgradient Observation Well is a thousand feet or more from the resource block wells. For instance, in Year 8 the closest Observation Well will be approximately a quarter-mile downgradient of the resource block wells. The commenter has found no justification or support in the record for the assumption that the water level at an Observation Well a quarter-mile from the well field is relevant to a demonstration of hydraulic control based on a 1-foot differential.

ADEQ response

The commenter has misinterpreted the permit requirement. Each well installed in the ISCR area will be constructed as a Class III well and will serve multiple purposes during ISCR Operations. ISCR wells will be used for injection, recovery, observation, or perimeter hydraulic control. The purpose of each well will depend on the phase of well field expansion. Therefore, as explained in Section 2.5.8, the Observation wells are located outside of resource blocks between the Perimeter wells and POC wells. Moreover, the Perimeter wells are located immediately adjacent to resource blocks in order to provide data for determining the inward hydraulic gradient. This configuration will provide confirmation that the inward hydraulic gradient (greater than a 1 foot differential) is maintained for a given resource block. Depending on the configuration of the given resource block, the spacing between Recovery and Perimeter wells would range from approximately 50 to 70 feet. Florence Copper provided a proposed ACD demonstration plan to EPA on November 17, 2020 as supplemental information for the UIC Permit. Figure A-19 of the plan provides the general configuration of the Observation and Perimeter wells during the early phase of well field expansion.

68.73. Permit Section 2.5.8.1 & Table 15: The permit requires inward hydraulic gradients to be demonstrated through "four triplets" of wells, each consisting of one Recovery or Perimeter Well, one Observation well, and one POC well or "water level well." Presumably, the applicant could use an Observation Well and Perimeter Well for a triplet that are located upgradient of the resource block. The commenter has found no justification or support in the record for the assumption that the water levels at Observation and Perimeter Wells upgradient of the resource block are relevant to a demonstration of hydraulic control downgradient of the resource block.

ADEQ response

The commenter has misinterpreted the permit requirement. Refer to response to comment 68.72. Inward hydraulic gradients must be maintained in all directions towards a given resource block. Therefore, observed

water levels from well triplets in the downgradient, upgradient, and sidegradient locations will be evaluated to demonstrate BADCT for hydraulic control.

68.74. Permit Section 2.5.8.1 & Table 15: The permit requires inward hydraulic gradients to be demonstrated through "four triplets" of wells, each consisting of one Recovery or Perimeter Well, one Observation well, and one POC well or "water level well." But Table 15 establishes an Alert Level that is based on a differential in groundwater levels between a Recovery or Perimeter Well and a POC well. The permit does not explain why an Observation Well is included in a "triplet" but excluded from the Alert Level calculation. In Section 2.7.4.2.1, the operations and monitoring report is required to include daily flows in and out of the ISCR well field if "any one of the well triplets indicate less than 1-foot differential." The permit should clarify why Alert Levels are not based on all three wells of a triplet.

ADEQ response

Refer to response to comment 68.72. The BADCT AL in Table 15 is correct. The Observation well is a component of the BADCT monitoring the water level at the edge of the well field. Note that the observed water levels at the Observation wells will be used to construct potentiometric maps required in the Pre-Operational Reports and Quarterly Monitoring Reports. The Alert Level criterion uses the Perimeter wells and POC wells near the PMA boundary because these observation points will be located further away from the I/R wells than the Observation wells. Therefore, it is more conservative to set the AL for these wells than to include the Observation wells.

68.75. Permit Section 2.5.8.1 & Table 15: Measuring compliance based on a 1-foot water level elevation difference between observation and recovery wells has never been demonstrated to be protective. Recovery well water levels are necessarily lower than the water table measured at the observation wells because of drawdown due to pumping, and this effect is exacerbated by pumping well inefficiency. The applicant has never quantified the drawdown and efficiency effects but has admitted both occur. The effect almost certainly accounts for more than 1 foot of elevation difference which means that simply meeting the permit requirement as written is meaningless. This is a serious real-world problem. For example, water levels in well R-07 are consistently close to those of its observation well pair (O-5 and O-6). In reality, the water table near R-07 may well be at or above what is measured in the observation wells. Further, water table maps submitted to EPA often display contours demonstrating a failure to create a drawdown cone extending out 500 feet, with the potential breach in the cone often near R-07. Also of note is that the west-northwest gradient is the one direction where Bulk EC data suggest a possible leachate escape pathway.

ADEQ response

The commenter has misinterpreted the permit requirement. The PTF well field operations did not indicate any well inefficiencies that would lead to a loss in hydraulic containment. The daily average water level elevations between Recovery well R-07 and the nearest Observation wells, O-05 and O-06, have consistently met the BADCT requirement of a 1 foot head differential during PTF operations (please refer to Attachment 2 of the Quarterly Monitoring Reports). Also note that the potentiometric surface maps submitted in the Quarterly Monitoring Reports have shown that a cone of depression has been maintained since PTF operations began in December 2018. The potentiometric surface maps have also shown that the radius of influence from pumping wells extend beyond 1,000 feet downgradient from the center of the PTF well field (Please refer to Response 68.70). In addition, ADEQ has reviewed the Bulk EC data provided in the Quarterly Reports and has not observed any trends or AL exceedances that would suggest an excursion of leachate solution beyond the well field.

68.76. Permit Section 2.5.8.1, 2.7.4.3 & Table 15: The permit requires installation details for Observation Wells to be provided in a pre-operational report for each new resource block. Presumably, the 45 Observation Wells required in the permit will be installed over the course of mine operations, rather than at one time before mining begins. The permit contains no schedule for installation nor any explanation of how the applicant will determine when a given Observation Well will be installed. The permit should expressly require some minimum demonstration or analysis to support the sequence and timing of Observation Well installations.

ADEQ response

Please refer to response to comment 68.72 regarding the sequence of resource blocks during ISCR operations. Note that the Observation wells are installed as the mine expands and are evaluated in the Pre-Operational Reports (see Section 2.7.4.2.1). In addition, all Class III wells must meet the MIT requirements specified in the Florence Copper UIC Permit.

68.77. Permit Section 2.5.8.2 & Table 15: The second sentence of Section 2.5.8.2 is misleading. Perimeter Wells are not located "immediately adjacent" to all resource blocks. For instance, the Year 8 resource block will have no Perimeter Wells adjacent, with the closest Perimeter Well located over 750 feet upgradient of the well field. Perimeter Wells are located surrounding the overall ISCR Area, but not adjacent to every resource block.

ADEQ response

The commenter has misinterpreted the permit requirement. Please refer to response to comment 68.72.

68.78. Permit Section 2.5.8.2 & Table 15: PTF operations were not designed to demonstrate that perimeter wells would work for hydraulic control, nor does available PTF data do so. The permit is unreasonably vague as to where perimeter wells will be located and the justification for their location and number. The application makes no demonstration to support proposed locations or numbers.

ADEQ response

Please refer to response to comment 68.72 in regard to the placement of the Perimeter wells. As described in Section 9.2.1 of the permit application, Perimeter wells at the edge of the active well field will be used to maintain and monitor hydraulic control. The Perimeter wells also serve an additional purpose in optimizing the extraction of copper bearing solutions by minimizing the amount of dilution from groundwater being drawn inward towards the well field (Please refer to Exhibit 2-1). The Perimeter wells will serve a purpose similar to that of the Recovery wells, which is to maintain hydraulic control during PTF operations (as demonstrated in the Quarterly Monitoring Reports). In summary, the Perimeter wells will provide additional hydraulic control around the active well field.

68.79. Permit Section 2.5.8.2 & Table 15: The permit requires inward hydraulic gradients to be demonstrated through "four triplets" of wells consisting of one Recovery or Perimeter Well, one Observation well, and one POC well or "water level well." Presumably, the applicant could use an Observation Well and Perimeter Well for a triplet that are located upgradient of the resource block. The commenter has found no justification or support in the record for the assumption that the water levels at Observation and Perimeter Wells upgradient of the resource block are relevant to a demonstration of hydraulic control downgradient of the resource block.

ADEQ response

The commenter has misinterpreted the permit requirement Please refer to responses to comments 68.72 and 68.73.

68.80. Permit Section 2.5.8.2 & Table 15: The permit requires installation details for Perimeter Wells to be provided in a pre-operational report for each new resource block. Presumably, the 90 Perimeter Wells required in the permit will be installed over the course of mine operations, rather than at one time before mining begins. The permit contains no schedule for installation nor any explanation of how the applicant will determine when a given Perimeter Well will be installed. The permit should expressly require some minimum demonstration or analysis to support the sequence and timing of Perimeter Well installations.

ADEQ response

Refer to response to comment 68.72. Note that the Perimeter wells are installed as the mine expands and are evaluated in the Pre-Operational Reports (see Section 2.7.4.2.1). In addition, all Class III wells must meet the MIT requirements specified in the Florence Copper UIC Permit.

68.81. Permit Section 2.5.8.2 & Table 15: The permit application indicates that Perimeter Wells will be pumped to maintain hydraulic control and provides a total proposed flow rate of 660 gpm for the Perimeter Wells (less than 8 gpm per each Perimeter Well). The commenter could find nothing in the permit indicating that the Perimeter Wells are to be used for hydraulic control and there are no minimum pumping requirements for these wells in the permit. The permit should expressly state this purpose of the Perimeter Wells and provide for minimum pumping rates, subject to reasonable adjustment upon appropriate demonstration by the applicant.

ADEQ response

Please refer to response to comment 68.78. As described in Exhibit 2-1, 660 gpm is the estimated nominal flow rate for maintaining hydraulic control for the well field, which is based on 6% of the estimated maximum value of the injected leachate solution. Note that the 660 gpm is not intended to be a performance criteria but is rather the anticipated control flow at maximum well field capacity (used for optimizing the well field infrastructure). The 6% overpumping estimate has been applied as one of the BADCT requirements specified in Table 15. These requirements are appropriate and more accurate criteria for maintaining hydraulic control at any time during ISCR operations. Please refer to response to comment 68.6.

68.82. Permit Section 2.5.8.2 & Table 15: The permit application indicates that Perimeter Wells will be pumped to maintain hydraulic control and provides a total proposed flow rate of 660 gpm for the Perimeter Wells (less than 8 gpm per each Perimeter Well). But the application does not explain how this flow rate will be maintained if Perimeter Wells are installed over time during mining operations, as is apparently allowed by the permit.

ADEQ response

Please refer to response to comment 68.81. The 660 gpm is not a performance criterion for maintaining hydraulic capture or BADCT. The configuration of the Perimeter well network will change as the ISCR well field expands (refer to Responses 68.72 and 68.73). The 6% overpumping is a BADCT requirement for maintaining hydraulic control for all stages during ISCR operations.

68.83. Permit Section 2.6: The contingency plan included in the application does not address contingencies for off-site contamination, including contamination of off-site drinking water wells. The applicant's modeling of conditions up to 30 years after closure shows that contaminants will flow approximately 2,000 feet beyond the site boundaries in the LBFU. It is reasonably foreseeable that drinking water wells may be constructed in or near this area in the future. The contingency plan and permit should include contingencies to address treatment or replacement water supplies if a drinking water well becomes contaminated.

ADEQ response

Please refer to response to comment 68.54. As the DIA groundwater modeling demonstrates, the anticipated impacts to groundwater downgradient of the ISCR well field is minimal relative to AWQS. However, as specified in Section 2.6.5, the permittee must respond immediately to any threats to downgradient receptors. Note that the appropriate corrective actions are specified in Permit Section 2.6.6.

68.84. Permit Section 2.6.1 & 2.6.6: The permit incorporated the approved contingency and emergency response plan submitted in the application. The permit should specify with more clarity the name and date of the plan submitted with the application and approved, given that this facility will be operating for decades and subsequent operators may not be familiar with application materials filed in 2019.

ADEQ response

Permit Section 5.0 includes a reference to the approved contingency plan; the date of the plan has been added.

68.85. Permit Section 2.6.1: The permit requires a copy of the approved contingency and emergency response plan submitted in the application to be kept "at the location where day-to-day decisions regarding the operation of the facility are made." It is not clear what the quoted language means but could allow for the plan to be kept at the applicant's headquarters in another city or country. A current copy of the plan should be maintained at the facility itself for reference by on-the- ground staff.

ADEQ response

The permit language cited incorporates specific rule language (A.A.C. R18-9-A204) which is used in all current APP permits; ADEQ believes this language is adequate. ADEQ concurs that the approved contingency and emergency response plan should be kept on-site at the Florence Copper facility at 1575 W. Hunt Highway, Florence, Arizona.

68.86. Permit Section 2.6.2.1.1 & Table 10: The permit provides performance levels for freeboard in surface impoundments. Presumably, freeboard performance levels were based in part upon the size and construction of the impoundments and upon projected fluid inflows into the impoundments. In January 2020, the applicant installed a large aboveground tank at the PTF facility to store overflow from PTF impoundments. This calls into question the accuracy of the applicant's process flow calculations and projections. The reasons for needing this supplemental storage capacity should be investigated to determine if the calculations and projections in the application are reasonable and reliable.

ADEQ response

The two-foot freeboard requirement is established as a permit requirement to prevent overtopping in response to the design storm event and to provide additional capacity in the event of system failure, shutdown due to power failure, or similar events.

The pond design basis, including required pond capacity, is documented in application Exhibit 9-2: Design Documents Pertaining to Ponds, letter signed and sealed by Richard J. Frechette, P.E., Senior Geotechnical Engineer, Haley and Aldrich, to Glenn Hoffmeyer, Florence Copper, dated June 12, 2019.

ADEQ reviewed and concurs with the design basis for pond capacity requirements. The design is based on Florence Copper's and the design engineer's current understanding and estimates of pond capacity needs. If actual operational conditions require additional evaporative/storage capacity, Florence Copper may need to make adjustments to the pond design/operation and amend the permit accordingly.

Note that tanks are exempt from APP requirements per A.R.S. §49-250.(B)(22).

68.87. Permit Section 2.6.2.2 & Table 11: The notice and action schedule in the permit for liner leakages allows up to 165 days or longer for a leaking liner to be repaired. This will allow an unreasonably large volume of contaminated water to be released from an impoundment. For instance, if Water Impoundment 1 leaks at just above Alert Level #1 (15,840 gallons per day), over 2.6 million gallons (8 acre-feet) of contaminated water could be released from the impoundment before repairs are required to be completed. The permit should expressly require soil and groundwater monitoring in the event of such large releases, as the POC wells currently required in the permit are too far from the impoundment to reasonably monitor for potential groundwater contamination. The permit requires such investigation with regard to overtopping (Section 2.6.3.2); there appears to be no reason it shouldn't be required here as well. In the alternative, the notice and repair schedule should be significantly shortened.

ADEQ response

See response to comment 64.36.

68.88. Permit Section 2.6.2.2 & Table 11: The Alert Levels for liner leakages are unreasonably high, with Alert Level 2 allowing over a half-million gallons of leakage daily. These unreasonably high levels are exacerbated by the lengthy periods allowed for response actions. No justification or explanation has been found for these unreasonably high Alert Levels.

ADEQ response

See response to comment 64.36.

68.89. Permit Section 2.6.2.3: If Alert Level #2 is exceeded in an impoundment liner, the permit requires that discharges to the impoundment cease "as soon as practicable." This is an unreasonably vague standard, as practicality can be interpreted to include operational, financial, and other factors that may hinder a prompt response. The permit should be revised with language that assures a prompt response.

ADEQ response

ADEQ interprets "practicable" to mean able to be reasonably done from the standpoint of technical practicability. This term is used throughout the permit and is standard language in similar permits. ADEQ believes the meaning is clear and is consistent with the common definition of "practicable" of "able to be done or put into practice successfully."

68.90. Permit Section 2.6.2.10: The permit requirements for verification of an Alert Level exceedance for the cone of depression are unreasonably deferential to the permittee's self-interested assessment of the data. Section 2.6.2.10(1) appears to provide a list of excuses for such an exceedance, rather than reasonable standards for verifying an exceedance. Section 2.6.2.10(2) allows the permittee to self-verify that no exceedance occurred, with no reporting requirement. The permit should require all exceedances to be reported, with appropriate explanation where further verification found that no exceedance had occurred.

ADEQ response

Section 2.6.2.10 follows the concept used in other Section 6 contingency requirements, which is to confirm or verify an alert level exceedance prior to initiating actions to mitigate the exceedance. Section 2.6.2.10(1) provides the criteria for how to verify the exceedance; since the cone of depression is a BADCT performance level, rather than for example a groundwater verification sample, there is necessarily professional judgment involved in interpreting the verification criteria. The cone of depression maps compiled monthly and reported to ADEQ quarterly; any exceedance that was not addressed would become apparent upon ADEQ review. Additionally, there are multiple BADCT monitoring requirements that also confirm whether hydraulic control is maintained; the alert levels for these other monitoring parameters would potentially be triggered if in fact the cone of depression is not maintained. Finally, maintaining the cone of depression/hydraulic control is integral to the operation of the mine to produce copper, therefore, Florence Copper has a financial interest in addition to an interest in complying with permit conditions for environmental protection.

68.91. Permit Section 2.6.2.10: The permit allows an exceedance of a cone of depression alert level for up to 30 days. This is an unreasonable duration and should be significantly shortened to ensure adequate protection of the aquifer.

ADEQ response

The commenter has misinterpreted the permit requirement. The Permittee must take contingency actions within 24 hours of becoming aware of AL exceedance as defined in Table 15. A summary report must be submitted to the Groundwater Protection Value Stream within 30 days of the permit conditions specified in Permit Section 2.6.2.10(3).

68.92. Permit Section 2.6.2.3(2) & Table 11: The 15 days allowed in the permit to conduct a visual inspection of a liner above the fluid level is unreasonably long. Alert level #2 for Water Impoundment 5 is 561,600 gallons per day. In 15 days, nearly 8.5 million gallons (26 acre-feet) of contaminated water could be released from the impoundment before the permittee first inspects the liner. There is no obvious reason that the inspection could not and should not occur much sooner.

ADEQ response

See response to comment 64.36.

68.93. Permit Section 2.6.2.3 & Table 11: The notice and action schedule in the permit for liner leakages allows up to 150 days or longer for a leaking liner to be repaired. This will allow an unreasonably large volume of contaminated water to be released from an impoundment. For instance, if Water Impoundment 5 leaks at just above Alert Level #2 (561,600 gallons per day), over 84 million gallons (258 acre-feet) of contaminated water could be released from the impoundment before repairs are required to be completed. The permit should expressly require soil and groundwater monitoring in the event of such large releases, as the POC wells currently required in the permit are too far from the impoundment to reasonably monitor for potential groundwater contamination. The permit requires such investigation with regard to overtopping (Section 2.6.3.2); there appears to be no reason it shouldn't be required here as well. In the alternative, the notice and repair schedule should be significantly shortened.

ADEQ response

See response to comment 64.36.

68.94. Permit Section 2.6.2.10 & Table 15: The permit requires a single potentiometric surface map monthly but does not indicate whether the map is required for each mine block or for the facility overall.

ADEQ response

For clarification, the potentiometric surface map must encompass the entire well field regardless if it's one or several resource blocks. Table 15 makes it clear that the map is facility wide.

68.95. Permit Section 2.6.2.10 & Table 15 The permit should require maps to show all measured water levels (injection, recovery, observation, compliance, and monitoring wells) not just the ones used to prepare the potentiometric surface map.

ADEQ response

The water levels obtained from the Injection and all the Recovery wells would be meaningless in determining BADCT monitoring given the potential head loss in the Recovery wells and additional pressures within the Injection wells induced during injection. The density of well control (i.e., Perimeter, Observation, and POC wells) in the active well field will be sufficient for constructing potentiometric surface maps and subsequent demonstration of inward hydraulic gradients in the well field.

68.96. Permit Section 2.6.3.1: This section references "overtopping/ but "overtopping" is addressed separately in Section 2.6.3.2.

ADEQ response

ADEQ concurs and has removed the reference to "overtopping" from permit Section 2.6.3.1.

68.97. Permit Section 2.6.6: This section references "specific contingency measures identified in Section 2.5.8.1." Section 2.5.8.1 addresses Observation Wells, not contingency measures.

ADEQ response

This quotation in this comment is incorrect. Permit Section 2.6.6 references "specific contingency measures identified in Section 2.6".

68.98. Permit Section 2.7.2: The permit requires a copy of the permit and log book to be kept "at the location where day-to-day decisions regarding the operation of the facility are made". It is not clear what the quoted language means

but could allow for the records to be kept at the applicant's headquarters in another city or country. A current copy of these records should be maintained at the facility itself for reference by on-the-ground staff.

ADEQ response

The permit language cited is used in all current APP permits; ADEQ believes this language is adequate.

ADEQ concurs that the permit and log book should be kept on-site at the Florence Copper facility at 1575 W. Hunt Highway, Florence, Arizona.

68.99. Permit Section 2.7.4.1.2: The first sentence of this section is missing words or a phrase.

ADEQ response

The typo has been corrected to add the underlined word as follows:

If an Alert Level #1 has been exceeded as discussed in Section 2.6.2.2 and/or 2.6.2.3, the permittee shall submit an annual report that summarizes the results of the liner assessment.

68.100. Permit Section 2.7.4.3(5): For the Pre-Operational Report, the permit requires information on borehole and well abandonment with "details as described in Section 2.7.4.5.3." There is no Section 2.7.4.5.3 in the permit.

ADEQ response

The typo has been corrected to reference Section 2.7.4.2.2.

68.101. Permit Section 2.8: The permit allows temporary cessation of mining activities to continue indefinitely. It is unreasonable to allow prolonged inactivity at this site without requiring site closure, given that it is located within the municipal boundaries of the Town of Florence. The permit should limit the periods of in activity, providing that revocation and reissuance of the permit is required if the facility is not active for a defined period and closure of the site is required if the facility remains inactive for a defined period.

ADEQ response

See response to comment 64.56.

68.102. Permit Section 2.9.1.1: The permit requires rinsing to begin 6 months after unspecified wells in a resource block are "taken out of service." The permit should be specific in describing the wells at issue. The commenter found no justification for the 6-month period between ISCR operations and rinsing in a resource block.

ADEQ response

The six month period between ISCR and rinsing allows for operational flexibility (please refer to Response 68.27). As stated in Permit Section 2.1, each resource block measures 500 by 500 feet and will include approximately 61 injection and recovery wells. The injection and recovery wells that have been taken out of service will be used to rinse the formation while injection and recovery operations continue in other areas of the ISCR Area.

68.103. Permit Section 2.9.1.1: The permit does not require hydraulic control within each resource block, only at the perimeter wells. Therefore, groundwater and contaminants will be allowed to flow downgradient from one active mining block into another. Given the proposed sequence of mining resource blocks over 20 years, this means that groundwater and contaminants from active resource blocks will be flowing into downgradient resource blocks that have undergone or are undergoing rinsing and restoration. No explanation has been found as to how this arrangement will work as a practical matter in the field or why it should be allowed and the permit contains no provisions for re-testing a "clean" resource block after rinsing has ceased.

ADEQ response

This is an incorrect interpretation. The APP and EPA UIC permit both require that Florence Copper maintain hydraulic control of injected solution by extracting more fluid than is injected within each resource block. The excess extraction will serve to draw groundwater toward the well field from the surrounding formation to ensure inward groundwater flow (Please refer to Tables 6 and 15). Perimeter wells at the edge of the active well field will also be used to maintain and monitor hydraulic control (please refer to Responses 68.73 and 68.78). The description of hydraulic control during well field progression is also provided in Florence Copper's October 29, 2020 Supplemental Information for the UIC Permit.

68.104. Permit Section 2.9.1(3): The permit allows groundwater rinsing to cease if individual wells in a resource block meet pH and sulfate standards. Aside from geochemical and groundwater modeling, discussed in other comments, no demonstration has been made that sampling for these 2 parameters is enough to ensure that other contaminants in the

resource block do not exceed applicable standards. The permit should require sampling for all constituents in Table 14 and rinsing should be required to continue if any exceedances are found.

ADEQ response

Permit Section 2.9.1.1 requires sampling of Table 12 constituents after the pH and sulfate meet rinsing standards. If the results of the sampling show concentrations of parameters greater than the AWQS and or greater than the ambient background mine block concentrations, then rinsing operations will continue until all compounds are below the corresponding AWQS or pre-operational conditions for those parameters with AWQS.

68.105. Permit Section 2.9.1(4): The permit requires confirmation monitoring after rinsing only at Rinse Verification Wells, whose numbers and locations are to be determined. The permit requires 5 wells per resource block, or 1 well per 12 installed wells, to be used for ambient groundwater monitoring. (Section 2.2.3(5)). No explanation or support was found for limiting the number of verification wells; a single well in a resource block is not reasonable for verification purposes. A reasonable minimum number of Rinse Verification Wells should be required in each resource block.

ADEQ response

Note that prior to proceeding to confirmation monitoring, all wells must be sampled and meet the AWQS (or pre-determined mine block concentrations) criteria for those parameters with AWQS. The confirmation monitoring is to verify the effectiveness of rinsing and to measure the potential rebound of mining derived contaminants. The 5 Rinse Verification Wells (RVWs) will monitor the 500 x 500 foot resource block. Given that tracer velocities measured within the PTF averaged 10 feet per day (or 3,650 feet per year) during pumping conditions (see Exhibit 14-3), the 5 RVWs will more than adequately detect a rebounded constituent anywhere within the resource block. The same is true for smaller sized resource blocks along the edges of the proposed well field given that the spatial coverage (1 Verification well per 12 installed) is the same as the full sized resource block, i.e., the RVW spatial coverage will remain equal throughout the ISCR well field.

68.106. Permit Section 2.9.1(4): The one year for confirmation monitoring is an unreasonably short time that will not adequately reveal potential rebound conditions in the aquifer.

ADEQ response

Note that the RVWs are left in place for the life of the ISCR Wellfield. If there are any issues in the well field then those RVWs left in place may be resampled. The monitoring duration post-rinsing is based on the results of rinsing conducted during the BHP Copper test in 1997 and 1998. The information derived from the BHP Copper test is further supported by subsequent laboratory testing conducted by Florence Copper, the results of geochemical and hydrological modeling completed in 2010 and 2019 (refer to Exhibit 2-1). For example, groundwater sampling and analysis between 2000 and 2010 in all wells within the BHP test well field supported the post rinsing geochemical modeling results (Table 1; Exhibit 10-1), which confirm that formation rinsing can effectively restore groundwater below AWQS or pre-operational concentrations. Furthermore, analysis of the geochemical conditions after rinsing will include geochemical modeling of the long-term equilibrium of the residual solid phase mineral constituents (refer to Permit Section 2.7.4.5). ADEQ will reconsider the duration of confirmation monitoring should the post-rinsing data and modeling conflict with previous interpretations related to the BHP Copper test.

68.107. Permit Section 5.0: The list of "references and pertinent information" is clearly incomplete and does not include all of the information submitted by the applicant for review of the permit. It does not include the PTF data and documentation that purportedly were intended to support this permit. Moreover, it does not include historical data and documentation upon which the applicant and ADEQ relied or which is otherwise relevant to a full understanding and analysis of the project. The commenter has attached, as Exhibit 1 to these comments, an index of documents that should be included in Section 5.0 as reference documents and that should be part of the administrative record for this permit. The commenter hereby incorporates all of these documents into these comments by reference. The listed documents are being hand-delivered to ADEQ on an electronic drive.

ADEQ response

ADEQ concurs that Section 5.0 does not include a complete list of all Florence Copper submittals under this amendment application. The administrative record includes all the Florence Copper submittals and ADEQ review documents. The APP statute and/or rule do not require the permit to include a complete list of documents.

#69 Brent Berg: commenter submitted a letter dated October 12, 2020 and provided verbal comments during the public hearing

October 12, 2020 letter

69. Florence Copper Inc. (Florence Copper) thanks the Arizona Department of Environmental Quality (ADEQ) for conducting the public hearing on September 9, 2020 and for considering the public comments submitted by Florence Copper in support of the Florence Copper Project and the Significant Amendment to the existing site-wide Individual Aquifer Protection Permit (APP) No. 101704 (Significant Amendment). Florence Copper also appreciates ADEQ's decision to issue the Significant Amendment.

Florence Copper would like to address two allegations that were raised at or prior to the public hearing. As the permittee with substantial financial and business interests at stake, Florence Copper also reserves the opportunity to respond (even after close of the comment period) to any public comments opposing the Significant Amendment, and in particular, any comments submitted by Southwest Value Partners and the Town of Florence, which have unsuccessfully opposed and challenged the Florence Copper Project in multiple administrative and judicial proceedings to date.

1. The Significant Amendment to the existing site-wide Individual APP is required by the Temporary APP, incorporates data from the PTF, fully complies with Arizona law, and is timely and appropriate.

An opponent of the Florence Copper Project claimed that the Pilot Test Facility (PTF) authorized by Temporary APP No. P-106360 ("Temporary APP") was not complete; PTF data was not provided to ADEQ; and, as a result, the Significant Amendment is somehow premature and improper. ADEQ should reject these claims because they are not supported by the facts and law and ignore the plain language of the Temporary APP, which envisioned and required the application for the Significant Amendment prior to the expiration of the Temporary APP.

The Temporary APP was issued on July 3, 2013 and was amended on August 3, 2016. The Temporary APP authorized Florence Copper to construct and operate the PTF over a two- year period, consisting of a 14-month leaching phase and a nine-month rinsing phase. The PTF was constructed in 2018, began operations in December 2018, and is now in the rinsing phase. The construction, operation, and testing of the PTF yielded valuable data and information and demonstrated that Florence Copper successfully maintained hydraulic control, effectively demonstrated best available demonstrated control technology (BADCT), successfully monitored operations, and safely operated and produced copper. Pursuant to the terms of the Temporary APP, Florence Copper provided all data and information regarding the construction, operation, and testing of the PTF to ADEQ. This data and information demonstrate that the PTF and in-situ copper recovery (ISCR) were successful and that commercial operations at the Florence Copper Project can move forward.

The Compliance Schedule in the Temporary APP required Florence Copper to submit an application for an amendment to the existing site-wide Individual APP, which has been in place since 1997, to incorporate discharging facilities and associated closure costs from the Temporary APP into the existing Individual APP within 180 days of the effective date of the Temporary APP. Pursuant to the Compliance Schedule, Florence Copper submitted its Significant Amendment Application to ADEQ on June 12, 2019 (Application). In addition to the required amendments, Florence Copper incorporated the additional data and information developed during the construction, operation, and testing of the PTF into the Application, which identified the following itemized changes:

- Incorporate discharging facilities and associated closure requirements from the Temporary APP into the site-wide Individual APP.
- Incorporate data and information generated during the construction, operation, and testing of the PTF into the site-wide Individual APP. Specifically, discharging facilities associated with the Temporary APP were constructed during 2018. Data and information developed during construction, operation, and testing of these facilities yielded valuable observations that were used to update and improve the site-wide Individual APP.
- Revise discharge limitations to reflect the planned commercial operations.
- Incorporate updated closure cost estimates.
- Incorporate design revisions for solution impoundments and process solution ponds that were authorized but never constructed utilizing the data and information developed during the construction and operation of the PTF.
- Update injection and recovery well design information.
- Update BADCT using the description and requirements in the Temporary APP and proposing incorporation into the site-wide Individual APP.

- Revise the pollutant management area (PMA) to reflect the revised solution impoundments, process solution ponds footprint, and BADCT and cones of depression.
- Replace two Point of Compliance (POC) wells that have gone dry and to relocate these POC wells to reflect impoundment and pond design changes.
- Incorporate newly developed hydrologic data and information and a revised Discharge Impact Area (DIA).

Florence Copper's Application was timely; based on data and information developed during the construction, operation, and testing of the PTF; and consistent with the compliance schedule in the Temporary APP and Arizona law. ADEQ's processing of the Application and issuance of the Significant Amendment was consistent with its standard permitting process and Arizona law. ADEQ issued a significant, comprehensive permit that fully complies with Arizona law, protects drinking water supplies, and is one of the most detailed and stringent permits issued for any regulated facility in Arizona. As a result, any claims challenging the Significant Amendment, or the Application are without merit and should be rejected by ADEQ.

2. The Significant Amendment requires a demonstration that the PTF well field has been successfully rinsed prior to beginning commercial operations and contains detailed rinsing requirements.

The second allegation that Florence Copper would like to address relates to concerns about the timing and duration of rinsing, and containment of solutions during and after completion of rinsing. The Significant Amendment (Sections 2.2.5, 2.7.4.5, and 3.0, Table 5, Item 5) requires Florence Copper to demonstrate that rinsing of the PTF well field was successfully completed prior to beginning commercial operations. Specifically, Florence Copper must submit to ADEQ a rinsing demonstration report for the PTF well field prior to ADEQ's approval of operation of the first commercial ISCR resource block. As noted in Section 2.1 of the Significant Amendment, "[e]ach resource block measures 500 feet by 500 feet and will include approximately 61 injection and recovery wells." Florence Copper has already demonstrated that rinsing is effective and is able to return the injection zone to meet closure water quality criteria. (BHP previously demonstrated that rinsing can be successfully accomplished following ISCR operations.)

The Significant Amendment and the Draft Executive Summary prepared by ADEQ explain the construction, operation, and rinsing of resource blocks in detail. The Significant Amendment requires Florence Copper to meet closure water quality criteria through rinsing, which protects groundwater resources and fully addresses any concerns related to rinsing and commercial operations. Hydraulic control must be maintained throughout rinsing activities to ensure containment of solutions.

As background, the duration of injection and recovery operations for each resource block in the ISCR Area of the Florence Copper Project is approximately four years. The resource block will be taken out of service after the economically producible copper has been recovered. Once taken out of service, the wells in the resource block will be used to rinse the formation while injection and recovery operations continue in other resource blocks in the ISCR Area. At all times during initial resource block rinsing, hydraulic control will be maintained by sustaining an inward hydraulic gradient within the resource block. Only after individual well sulfate concentrations in the mine block are less than 750 ppm and the pH is above 5.0 S.U., can hydraulic control be discontinued, and the resource block allowed to rest for 30 days. At the end of the 30-day rest period, the wells will be re-sampled and if sulfate concentrations remain below 750ppm and pH remains above 5.0 S.U., rinsing may cease. No migration of mining solutions beyond the resource block can occur under this rinsing regime. When resource blocks are taken out of service, the Significant Amendment continues to require Florence Copper to demonstrate BADCT and meet Aquifer Water Quality Standards (AWQS) at POCs.

To complete rinsing, the Significant Amendment requires rinse solution to be injected into the injection zone and recovered to achieve closure water quality criteria. Rinsing is anticipated to continue for a period of two years at each resource block, during which time, approximately six to nine pore volumes of water will have been flushed through the bedrock formation. Rinsing will continue two years beyond the end of copper extraction operations. Once rinsing has been completed, each of the wells will be plugged and abandoned in accordance with state law and federal UIC regulations, except for selected wells that will remain open for post-closure monitoring. This rinsing will ensure that the injection zone achieves closure water quality criteria and ensures that there will be no future threats to drinking water supplies.

Thank you for the opportunity to address these issues. In addition, Florence Copper anticipates responding to any relevant comments in opposition to the Significant Amendment to the existing site-wide Individual APP.

Verbal comments during public hearing

Thank you. My name is Brent Berg and I am the general manager of Florence Copper. I hold a bachelor's degree in environmental systems engineering and a Master of Business Administration. I'm a professional engineer and a project management professional, and I've worked in the metal mining industry for over 23 years joining Florence Copper marks my ninth year working in the in-situ recovery industry, having previously worked for Excelsior Mining Corporation and Chemical Corporation in Arizona, and Wyoming, respectively. My testimony today draws on my experience both as a mining professional and as an environmental engineer that fully appreciates the responsibility of running a safe mining operation.

The success of Florence Copper's production test facilities is consistent with my experience at other in situ recovery operations, demonstrating that the mine can safely produce a valued commodity, while public safety and protection of the environment. While in-situ recovery of copper in Florence, Arizona, may be new, the development of in situ mineral recovery began in the late 1960 in the United States. What is new is the state-of-the-art technology, and safeguards being employed by Florence Copper. That longstanding history in the in-situ recovery industry, provides the fundamentals for protecting underground source of drinking water from underground injection. Those fundamentals are reflected in the US EPA's underground injection control permit and now ADEQ's robust aquifer protection permit.

Florence Copper's production test facility represents application of the best science, and technology to well regulated state and federal requirements. In-situ recovery mining, regardless of the mineral being extracted, operates under extensive oversight by local, State, and Federal authorities. In response to the proposed rulemaking on 2017, the Nuclear Regulatory Commission commented that in almost 40 years of operational experience, NRC's staff is aware of no documented instances of an ISR well field being the source of contamination of an adjacent or nearby aquifer or of the non exempt portion of the same aquifer which ISR activities are being conducted.

Florence Copper has taken, those in-situ recovery fundamentals, and improved, upon them with the production test facility. Florence Copper and ADEQ fully expect the commercial phase of operation to continue to meet its strict operating criteria. As a mining professional, I can assure you that the staff at Florence Copper are technically competent and take their responsibilities very seriously. They fully understand the technical aspects of this project as demonstrated by 18 months of successful operation of the facility. Each of us are committed to ensure the mine operates with the highest regard to public safety and protection of the environment. I look forward to the commercial operation of the mine, working with the local community, and shared development of a valuable public resource.

Thank you.

ADEQ response
Comment noted.

#70 Jennifer Saran: commenter submitted a letter dated October 12, 2020

70.1. Florence Copper Inc. appreciates the opportunity to provide comments on the draft Individual Aquifer Protection Permit No. 101704, LTF 76820, during the public comment period. Each comment detailed below is numbered for ease of reference, and the location of the comment in the draft permit is noted in bold text below each comment number.

Comment #1: Page 60 of 76, Table 14: ANNUAL GROUNDWATER MONITORING

For well M3-GL, the Alert Level (AL) for Gross Alpha is listed as 1 pCi/L in Table 14. Florence Copper believes this is a typographical error, and the value should be 15 pCi/L instead of 1 pCi/L.

Comment #2: Page 62 of 76, Table 14: ANNUAL GROUNDWATER MONITORING

For well M15-GU, the AL for Gross Alpha is listed as 1 pCi/L in Table 14. Florence Copper believes this is a typographical error, and the value should be 15 pCi/L instead of 1 pCi/L.

Comment #3: Page 70 of 76, Table 14: ANNUAL GROUNDWATER MONITORING

For well M54-O, the AL for Manganese is listed as 0.22 mg/L in Table 14. The Alert Level for M54-O in the current permit (Temporary APP No. 106360, p. 40 of 49) was 0.52 mg/L. Florence Copper believes this is a typographical error, and the value should be 0.52 mg/L instead of 0.22 mg/L.

Comment #4: Page 70 of 76, Table 14: ANNUAL GROUNDWATER MONITORING

For well M54-O, the Aquifer Quality Limit (AQL) for Adjusted Gross Alpha is listed as 26.5 pCi/L in Table 14. The AQL for M54-O in the current permit (Temporary APP No. 106360, Table 4.1-7, p. 40 of 49) was also listed as 26.5 pCi/L. Florence Copper believes this value should be 15 pCi/L instead of 26.5 pCi/L. This is based on the document "Procedures for Determining Alert Levels and Aquifer Quality Limits for Groundwater Compliance Monitoring" dated June 1, 2018, which documents the calculations for ALs and AQLs as required by the Temporary Aquifer Protection Permit No. P-106360 and the UIC Permit No. R9UIC-AZ3-FY11-1. In this document, Table 3 - CASE CRITERIA FOR SETTING ALs and AQLs, shows that there are different methods for calculating ALs and AQLs based on the type of well (i.e., POC well, supplemental well, all wells). Table 8a - RADIOCHEMICAL PARAMETERS, shows that for POC wells, the AQL for Adjusted Gross Alpha was calculated to be 15 pCi/L. Table 8a also shows that for supplemental wells, the AL for Adjusted Gross Alpha was calculated to be 26.5 pCi/L. It appears that the POC well M54-O was inadvertently assigned the AL for supplemental wells rather than the AQL for POC wells. Therefore, Florence Copper believes this value should be 15 pCi/L instead of 26.5 pCi/L.

Comment #5: Page 70 of 76, Table 14: ANNUAL GROUNDWATER MONITORING

For well M54-LBF, the Aquifer Quality Limit (AQL) for Adjusted Gross Alpha is listed as 26.5 pCi/L in Table 14. The AQL for M54-O in the current permit (Temporary APP No. 106360, Table 4.1-7, p. 40 of 49) was also listed as 26.5 pCi/L. Florence Copper believes this value should be 15 pCi/L instead of 26.5 pCi/L. This is based on the document "Procedures for Determining Alert Levels and Aquifer Quality Limits for Groundwater Compliance Monitoring" dated June 1, 2018, which documents the calculations for ALs and AQLs as required by the Temporary Aquifer Protection Permit No. P-106360 and the UIC Permit No. R9UIC-AZ3-FY11-1. In this document, Table 3-CASE CRITERIA FOR SETTING ALs and AQLs, shows that there are different methods for calculating ALs and AQLs based on the type of well (i.e., POC well, Supplemental well, all wells). Table 8a- RADIOCHEMICAL PARAMETERS, shows that for POC wells, the AQL for Adjusted Gross Alpha was calculated to be 15 pCi/L. Table 8a also shows that for supplemental wells, the AL for Adjusted Gross Alpha was calculated to be 26.5 pCi/L. It appears that the POC well M54-LBF was inadvertently assigned the AL for supplemental wells rather than the AQL for POC wells. Therefore, Florence Copper believes this value should be 15 pCi/L instead of 26.5 pCi/L.

Comment #6: Page 71 of 76, Table 15: IN-SITU BADCT MONITORING

In Table 15, IN-SITU BADCT MONITORING, the parameter "Fluid Electrical Conductivity" listed in Table 15, the "Wells Monitored Column" states: *Comparison of fluid sample collected from all Observation Wells and all Injection Wells*. Florence Copper proposes that this statement be revised to read: *Comparison of conductivity measurements taken from all Observation Wells and all Injection Wells*. This language change allows more flexibility and accuracy during operations in how these data are obtained: the conductivity values can be obtained from a sample of fluid taken from the well, or it can be obtained using an in-situ device that would be installed in the well and would automatically measure and record conductivity measurements.

ADEQ response

ADEQ concurs with the changes suggested in comments 1 through 5, based on the rationale provided.

Regarding comment 6, ADEQ agrees that the fluid electrical conductivity monitoring can be conducted either by obtaining samples, or using an in-situ device. The permit language in Table 15 will be revised as requested.

D. VERBAL COMMENTS

Verbal comments were received during the Public Hearing held September 9, 2020.

Commenters 71 through 89: Numerous commenters voiced support for permit issuance citing various reasons including the protection provided by the permit. ADEQ reviewed these comments and grouped them together because of their common theme.

ADEQ response
Comments noted.

#90, Brad Glass: Good evening, my name is Brad Glass and I'm an environmental attorney with Gallagher and Kennedy. I've represented Arizona copper mining companies for the past 16 years, and Florence Copper since 2013. I support ADEQ's decision to issue the significant amendment to the commercial APP. Throughout the permitting and operation of the Florence Copper Project, opponents of the project have expressed concern and fear about its operation, and argued that the project will adversely impact the town of Florence's drinking water supply. These concerns are not supported by fact, science or law, and should be rejected by ADEQ for at least six reasons.

First Florence Copper has repeatedly demonstrated that it is a responsible corporation, an environmental steward committed to complying with all Arizona and federal laws. Florence Copper proved this commitment by permitting, constructing and operating the pilot test facility or PTF, which utilized the best available demonstrated control technology, and proved that Florence Copper's in situ copper recovery, will not adversely impact drinking water supplies. Florence Copper's commitment to using the best science, and technology and to fully comply with Arizona Law will ensure that drinking water supplies are protected.

Second, ADEQ issued a stringent comprehensive, commercial APP that fully complies with Arizona Law, and protects drinking water supplies. Like the PTF's permit, the commercial APP is one of the most detailed, and stringent permits issued for any facility, whose operations involve the state's aquifers.

Third, the commercial APP contains extensive monitoring and reporting requirements, as well as associated alert levels, and contingency requirements that will address any and all concerns associated with the project, including all of those raised by opponents to date, and likely will be raised this evening. The permit's requirements will ensure ongoing regulatory compliance, and will immediately address any issues that are observed long before there's any threat to drinking water supplies.

Fourth, the commercial APP contains detailed closure requirements, and requires Florence Copper to maintain substantial financial assurance to ensure the proper closure occurs. These requirements directly address the concerns and fears raised by the opponents of the project, and ensure that the project closure returns the site to pre-operational conditions.

Fifth, the Florence Copper Project is one of the most highly regulated and closely monitored facilities in the state both ADEQ and EPA have regulatory oversight, and have permitting programs specifically designed to protect drinking water supplies. Florence Copper must and will comply with these permits issued by ADEQ and EPA and those permits, both individually and collectively will ensure the groundwater supplies are safe and protected.

Finally, the opponents of the project have repeatedly argued in multiple administrative and judicial proceedings that the project will adversely impact drinking water supplies. Those arguments have been carefully considered and rejected time and time again. The opponents current objections are no different, are not based in fact science or law, and they should be rejected. For each of these reasons the APP fully addresses the concerns raised by the opponents, and ensures that the project will not adversely impact areas drinking water supplies. Thank you for the opportunity to speak.

ADEQ response
Comments noted.

#91, John Anderson: I'm John Anderson. I live in Florence. I am the Vice-Mayor of the Town of Florence, but I want to make it very clear I'm speaking for myself personally. And these are my views and they have nothing to do with my position as Vice-Mayor, and I'm not speaking for the town or for the council.

91.1. That being said, I'd just like to point out, a couple of things that have been a little misleading over the years. The EPA has not specifically approved the in-situ mining process, as a matter of fact, the EPA regulations, very clearly state, in-situ mining is not allowed in an aquifer that's used for drinking water. However, and, I think it was in 1997, when the first owner of the land applied for an aquifer exemption, they got the aquifer exemption, and according to the EPA, that exemption still is in place. So, the EPA has no authority to do anything except approve the mine. So, that being said, I just want people to know that the EPA has not approved that the drinking water will be safe.

Second thing that I'd like to bring up, is the drinking water. At my house it comes from a well that is a mile and a half from the in-situ well and we talked about, how long will it take the water to flow from that well to my well, and when we had the EPA hearing I brought that up, they said, based on the flow rate they've seen, it would take 10 to 20 years for it to get here.

ADEQ response

Comments noted. ADEQ cannot comment on the U.S. EPA's position in regard to the UIC aquifer exemption or remarks made during an EPA public hearing.

ADEQ concurs with EPA's arrival time estimate to reach your well in the unlikely scenario of complete and ongoing loss of hydraulic control over mining solutions. Assuming a groundwater seepage velocity (advective transport) of 1.5 ft/day under non pumping conditions (i.e., no hydraulic containment), it is estimated that it would take approximately 14.5 years for a molecule of water to travel 1.5 miles from the ISCR well field to your well. Note that the advective transport estimate is based on the hydraulic conductivity (25 ft/day); formation porosity (0.2); and pre-ISCR mining gradient (65 feet/mile or 0.012 ft/ft) used to simulate groundwater flow in the Lower Basin Fill Unit (please refer to Exhibit 14-10 of the Permit Application).

91.2. I'd like to also bring up about the current testing that had been going on. The monitor wells, and this is based on Florence Copper's data that they gave us when I was on tour, about what their flow rate, and tell about how many feet, I think it was per month or per year that the flow rate is. And based on their data at the time, the monitor wells are so far away, it would take two years for the water from the in-situ well to reach the monitor well. So, all the testing that they've been done or are doing is sort of moot, you know. They already know what the answer is, because the monitoring wells are too far away to even be reached by what they're doing in their testing.

ADEQ response

See response to comment 64.11 for a discussion of the POC well locations in relation to the ISCR Area. The ISCR Area will also be monitored to assure that hydraulic control is maintained and that solutions do not escape the ISCR Area.

91.3. So, I guess, uh, there's a whole lot more that I could say on this. I've said that over the last six years, I've been voicing my opinion on this. And I would like to say that I have received no contribution from anybody involved in development or anything like that. My concern is particularly for myself, my family, and my neighbors and the safety of their drinking water. I am convinced they are polluting the aquifer, because there's no way you can put sulfuric acid in the aquifer and not pollute it. And there has not been a single in-situ mine, anywhere in the world that has, after they finished mining, have returned the aquifer back to drinking water standards. Now, you can go to the National Geological Society [at this point the Hearing Officer indicated that Mr. Anderson's time to speak had ended and he was welcome to submit additional written comments by email or regular mail].

ADEQ response

Comments noted. ADEQ recognizes the concerns expressed about the potential risks to groundwater from mining and the history of pollution caused by mining both in Arizona and around the world. ADEQ's Aquifer Protection Program is required to issue permits for facilities that meet the statutory requirements established by law and regulations to protect groundwater. The requirements allow pollutants to be placed in the aquifer within a pollutant management area, and the permit requires monitoring to assure that the pollutants are contained within that area. The permit requires a rinsing demonstration for the PTF facility prior to operation of the ISCR Area; see response to comment 59.6. The pollution risk can never be completely eliminated, however through BADCT controls, monitoring and ADEQ's oversight, that risk can be significantly reduced.

#92. Lee Decker: My name is Lee Decker and I'm with the Phoenix Law firm of Gallagher and Kennedy. Just as background, I've represented Arizona's copper mining industry for the past 29 years, and I appreciate this opportunity to speak tonight in support of ADEQ's proposed Aquifer Protection Permit for the Commercial Phase of Florence Copper's In-situ copper recovery facility. I commend ADEQ's efforts in putting together a comprehensive permit that will ensure that groundwater quality is protected beyond the footprint of the permitted area in full compliance with Arizona's aquifer protection laws and regulations, similar to the robust temporary aquifer protection permit that ADEQ issued and administered for the successful pilot production test facility. ADEQ's proposed permit authorizing commercial operations contains enhanced requirements that provide multiple layers of protection against impacts to surrounding groundwater.

These protections include first, 31 point of compliance wells, that ring the commercial mine, recovery and associated solution processing areas. The presence of these wells, and the required compliance monitoring conducted in each of the wells eliminate the potential for any offsite impacts to groundwater.

Second, and this responds to a comment I heard earlier, the permit requires extensive operational monitoring inside of the 31 point of compliance well and in immediate proximity to each in-situ copper recovery well block. Meaning that monitoring of maintenance of hydraulic control will not take two years to document. And this monitoring will confirm and document maintenance of hydraulic control during all phases of in-situ cup or recovery.

Third, the permit imposes a requirement to clean close the entire in situ copper recovery area, through rinsing until all compounds in the recovery area, are below aquifer water quality standards, which are drinking water standards or pre mining background concentrations. Closure requirements are backed up by surety bonds, held by ADEQ and the Federal Environmental Protection Agency.

In addition to the multiple layers of protection for groundwater in this proposed permit by ADEQ, Florence Copper is in the process of obtaining an amended underground injection control permit from the Federal Environmental Protection Agency for the commercial phase. It has an existing permit, the temporary pilot test. This separate federal permit will provide stand alone and redundant layers of protection for surrounding groundwater and adjacent property owners.

In summary, there is no legitimate technical or legal basis to challenge ADEQ's actions at issue in this hearing.

ADEQ has proposed to issue a robust permit that will ensure that the operation and closure of Florence Copper's in-situ copper recovery facility will not impact groundwater surrounding the facility now or in the future. Thank you.

ADEQ response

Comments noted.

#93. Mark Nicholls: My name is Mark Nichols. I'm a hydrogeologist with Hailing and Aldrich, an engineering firm located in Phoenix, Arizona. I've worked in support of the Florence Copper projects since 2010 on the permitting, development and monitoring of the pilot scale test production facility for PTF that's been operating at the site.

The PTF was designed using the same well design, hydraulic control methods, monitoring practices, as those planned for the future well field for the purpose of testing those features. The PTF field and planned future wellfield both rely on hydraulic control to prevent migration of the injected fluid beyond the wellfield area. Hydraulic control is established and maintained by pumping out a greater volume of fluid, than is injected. This over pumping results in inward groundwater flow towards the well field from all sides, which serves to control the injected fluids.

The PTF began operation in December of 2018 and has successfully demonstrated that copper can be produced using in-situ methods and that hydraulic control can be established and maintained using this over pumping method.

During PTF operations, Florence Copper successfully establish and maintain both horizontal and vertical hydraulic control of injected solutions. Hydraulic control was conclusively demonstrated by multiple monitoring metrics.

Water level data and water quality data from the PTF observation wells show the hydraulic control pumping established an inward groundwater flow and prevented migration of injected fluid beyond the wellfield.

Bulk Electrical conductivity monitoring and borehole annular conductivity monitoring demonstrated that hydraulic control pumping prevented the vertical migration of injected fluids.

Groundwater quality monitoring at the operational monitoring wells demonstrated that hydraulic control prevented the injected solution from migrating beyond the influence of the PTF recovery wells.

Groundwater quality monitoring at the POC wells confirmed that Arizona Aquifer Water Quality Standards were met at each of the POCs during PTF operations.

These operational and compliance monitoring data demonstrate that in-situ copper recovery operations can be conducted at the Florence Copper site in compliance with permit requirements and in compliance with established groundwater quality standards, and that the method of establishing hydraulic control is effective and protects drinking water sources beyond the well field area.

These facts confirm that the ore body has the necessary hydraulic characteristics to support sustained and controllable copper recovery operations at the Florence copper site.

The draft APP permit incorporates the same method of hydraulic control successfully applied at the PTF well field and incorporates well field design, control and monitoring elements proven to be effective during PTF operations.

Successful operation of the PTF has demonstrated that the operational, and environmental monitoring incorporated into the draft permit are effective and protective of drinking water sources in the environment.

These technologies have been demonstrated at the PTF well field, and incorporated into the draft permit and demonstrate that this project will be protective of the environment.

I appreciate the opportunity to speak on behalf of this project. Thank you.

ADEQ response

Comments noted.

#94. Richard Tremblay: Good evening, everyone. My name is Richard Tremblay. I'm the Vice President of Operations for Taseko Mines Limited. The Florence Copper operation is my direct responsibility at the corporate level. I wanted to speak today because I wanted everyone participating the public comment process to hear directly from me about who we are and what they can expect from us. Much of my 30 plus years as a professional chemical engineer has been spent working and living in small mining communities, helping to run large mining operations. Florence Copper is a subsidiary of Taseko Mines Limited, a Canadian mining company based in Vancouver, British Columbia. As far as mining companies go, we're considered small, or mid tier. Our main asset is the Gibraltar Mine in the central interior of British Columbia, employing 700 people near the Town of Williams Lake, population, just under 11,000. Our goal at Taseko's Florence Copper is excellence. Taseko has a track record of meeting that goal in different categories of performance. Our operations have won numerous awards for environmental achievement, safety performance and community service. Taseko Florence is committed to what we call realized collective potential, generating maximum benefit, an opportunity for people. It means working with integrity and with honesty, bringing together engineering, and science, and applying expertise and knowledge to protect and preserve the things we all care about, environmental integrity, protecting the water, the land, the air. The public interest matters to us. Over the past eight years, we have invited the public to come and tour Florence Copper. We have given over 300 separate tours to more than 2300 people. When we do our jobs right, the public benefits. Through our efforts, we hope that Taseko Florence Copper will be described by the people of the community as open and trustworthy. The investment we made in Florence Copper is made possible by the work done at Gibraltar. We are taking revenue generated by Gibraltar and investing it here directly for the benefit of Arizona and its citizens. There are at least four reasons why states like Arizona, welcome and encourage mining investment, foreign, or domestic. The first to benefit from mining operations, are the employees through salaries and employee benefits. Second are local, state and U.S. business and service providers, the people who sell the equipment, supplies, services and expertise needed to operate. Third are governments through revenues, and taxes generated. And finally or the company and its shareholders. Many of the largest shareholders of Taseko stock are U.S. based. Our shares are traded on the New York Stock Exchange. But the real story here, is the benefits of mining flow directly to the people of the in which the mining takes place. Over the past 19 months, Florence Copper has demonstrated environmental excellence in copper mining. The test is complete. The proof is in. The facility and the process has been proven safe. It has met all regulatory requirements expected of it. The drinking water is protected. We have proven on a technical basis how well the facility and process work and now we are very excited to see the culmination of the team's efforts come to fruition as we get set to invest a further 200 million and embark on commercial operations, which will provide many benefits for the community and the state of Arizona for many years to come. Thank you.

ADEQ response

Comments noted.

#95. Rita Maguire: My name is Rita Maguire and I serve as Florence Copper's, General Legal Counsel. I began working for Florence Copper in 2011 and I've been directly involved in all of its permitting and legal challenges. Although I serve as General Counsel, fielding questions on a wide range of issues, my area of expertise is actually water law and water management. For more than 25 years, I've been an actively practicing water lawyer, including nearly a decade at the Arizona Department of Water Resources as its director. My testimony today draws on my experience, both as a regulator and as an attorney that fully appreciates the value of the state's water supplies. The success of Florence Copper's Production Test Facility, is a sterling example of how our state's aquifers can be safely, and responsibly shared by municipalities, agriculture, industry, and the natural environment. Since 2011, 10 separate lawsuits have been filed against Florence Copper by the Town and Southwest Value Partners. Six of those suits have challenged the permits issued by ADEQ and EPA. The other four lawsuits brought exclusively by the Town, attempted to condemn Florence Copper's administrative offices, condemn its private property, prevent Florence Copper from mining the property as has been done in the past, and prohibit Florence Copper from transporting 50 gallons or more of sulfuric acid in the Town, while exempting other businesses from doing the same thing. Each of these lawsuits has been successfully overcome by Florence Copper, and resulted in the award of millions of dollars of legal fees against the Town. Currently, we are waiting for the Arizona Court of Appeals to rule on the last outstanding appeal by the Town, challenging Florence Copper's right to mine its property. Certainly, the town has an obligation to protect its residents and was entirely justified in challenging the operating permits issued by DEQ and EPA if it sincerely believed that these permits did not adequately protect the environment.

But, after separate independent reviews of these permits resulted in them being upheld, shouldn't that satisfy the Town that Florence Copper has met all State and Federal regulatory requirements and does not threaten the town's water supply? Perhaps not, but the successful operation of the PTO for the last 18 months should.

ADEQ's issuance of a permit for commercial operation tells us two things. First, Florence Copper has successfully operated its PTF facility within the strict regulatory parameters of its permit, and second, ADEQ expects the commercial phase of operation to continue to meet the strict criteria.

As a former State regulator, I can assure you that the staff at DEQ and EPA are technically competent and take their responsibilities to the public very seriously. It's important to remember that the groundwater in the aquifers is not simply for drinking water, it is a public resource available for lawful use by municipalities, agriculture, and industry. This is what makes for thriving communities. Thank you.

ADEQ response

Comments noted.

#96. Glen Hoffmeyer: Thank you, and good evening. My name is Glenn Hoffmeyer, Technical Services Manager at Florence Copper. I'm a graduate of Michigan Technological University with the 30 years of mineral processing experience in the US. Copper industry. I'm also a nine year resident of the Magic Ranch community. My comments are based on my experience as a metallurgical engineer that fully appreciates the technical rigor required to operate a modern in situ recovery operation.

For over 18 months, Florence Copper has successfully operated the pilot scale production test facility, or PTF, for the purpose of demonstrating the feasibility of this process. In preparation for the planned commercial scale operations, Florence Copper is committed to demonstrating that bedrock oxide formation can be rinsed to meet well field closure criteria established in the aquifer protection permit. Rinsing conducted at the Florence Copper site in the late 1990s, demonstrated both that formation can be rinsed to meet the State's closure criteria following operations, and that Arizona water quality standards are still met years after the completion of rinsing. That rinsing process involved the use of fresh water pumped into the ore body to displace process solutions. Subsequent laboratory analysis conducted by Florence Copper developed a three phase rinsing process to improve upon earlier rinsing success. The results of the laboratory tests work, enabled a better understanding of the geochemistry related to the ore deposit and improved rinsing efficiency.

In preparation, for rinsing the PTF well field, the addition of acid to our copper recovery solutions ended in June. This first step, in the rinsing process initiated the reduction of both free acid and sulfate in the ore body, while facilitating the continued removal of dissolved constituents. Florence Copper will begin fresh water injection after the concentration of dissolved constituents has declined. Fresh water for injection will be followed by the addition of sodium bicarbonate, also known as baking Soda, and Ferric Iron, which is routinely used in water treatment. The addition of these compounds will restore the buffering capacity of the formation and reduce the solubility of the remaining mineral constituents. Over the coming months, we will employ these final rinsing steps, at the PTF to meet the well field closure criteria required by the aquifer protection permit. This important final step will demonstrate that the aquifer can be returned to the baseline conditions following copper recovery operations. As a metallurgical engineering professional, I want to assure you that we have applied the best science and engineering to demonstrate the feasibility of in-situ copper recovery, and we will continue to do so, as we complete this last necessary step of rinsing the production test facility. Florence Copper's commitment to using the best science and technology, and to fully comply with all applicable laws, will provide assurance that drinking water supplies are protected now and in the future. Thank you for your time.

ADEQ response

Comments noted.

END OF DOCUMENT